

A.

T R E A T I S E

ON THE

Blue Epidemic Cholera.

BY

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S U R G E O N,

1st BENGAL EUROPEAN FUSILIERS.

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TO

WILLIAM JACKSON, ESQ.,

MEMBER OF THE ROYAL COLLEGE OF SURGEONS OF ENGLAND;

AND

MAJOR GENERAL

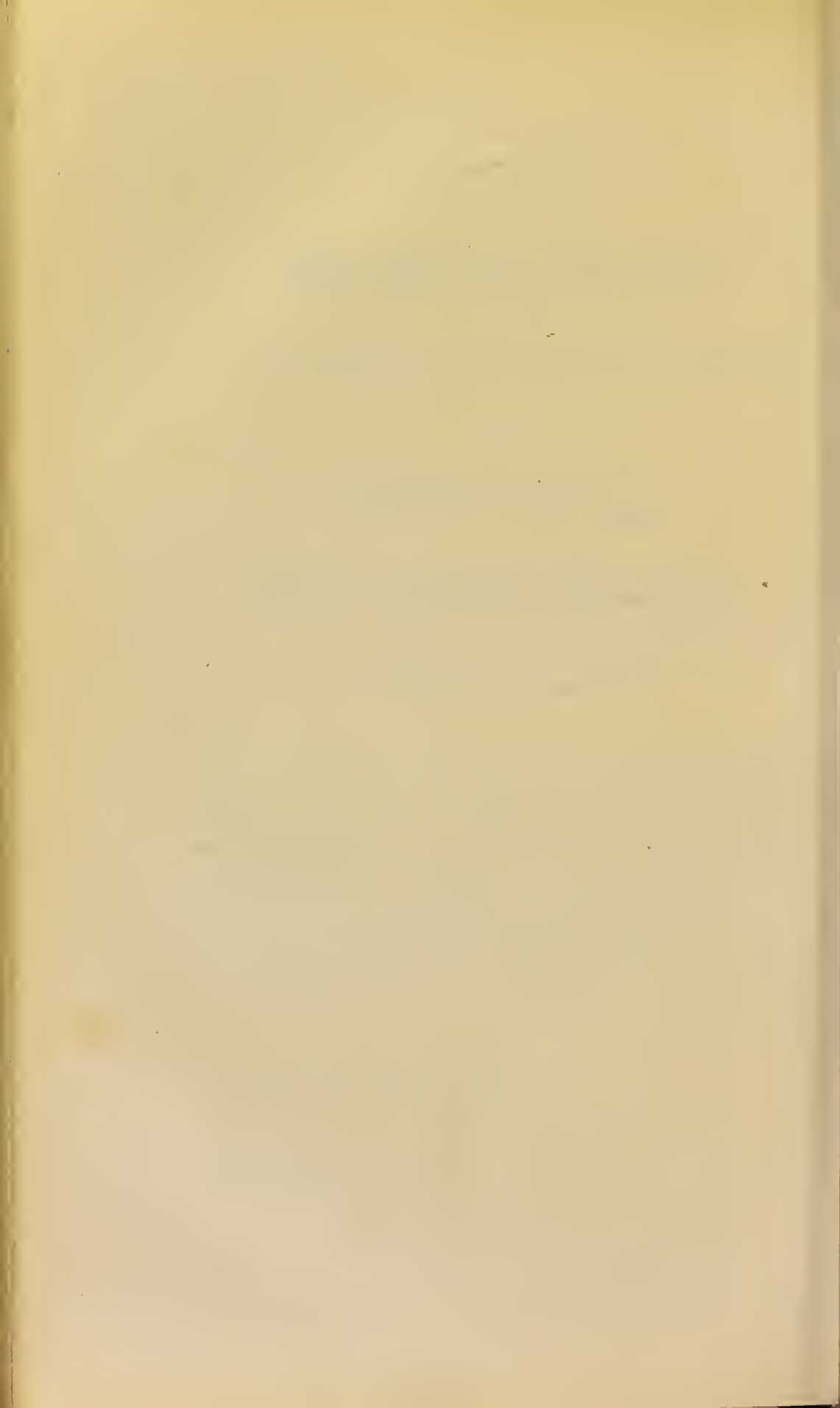
HORATIO THOMAS TAPP,

H. E. I. C'S. SERVICE;

To the former, as a zealous and talented member of the Medical profession, and whose responsible situation of Superintending Surgeon of the North Western Frontier of India during the Blue Epidemic Cholera of 1845, conferred on him the most ample opportunities of witnessing the disease; to the latter, as the philanthropist, who during his long career in India has ever evinced the liveliest interest in every thing intended for the welfare of his fellow creatures, this Treatise is, respectfully, dedicated as a small tribute of esteem and regard by their

Sincere friend and well wisher,

THE AUTHOR.



P R E F A C E .

In 1843, a work was published, by the Author of this Treatise, on the "*Principal diseases affecting the health of the European and Native soldiers in the N. W. Provinces of India.*" Among other subjects discussed in it, Cholera obtained some attention, and a mode of cure which, in the Author's hands, had been always successful, since its adoption in 1841, fully explained.

When every symptom of Cholera, except the Blue Skin, was present, such as want of pulse, cold, clammy skin, incessant thirst, purging, vomiting, spasms, cold tongue and expired air equally cold, areolæ around the eyes, the disease had yielded, and that in every instance. Several of the cases were given in the work alluded to, others, when well marked, were published in the *Medical and Surgical Journal for the N. W. Provinces.*

Under these circumstances, and after waiting until the remedies should be tested repeatedly, I, at length, ventured to recommend them to the profession, stating, at the same time, that

had not had an opportunity of witnessing their effects in Epidemic Cholera.

I applied the term Spasmodic Cholera to some of the cases in which I had succeeded, but I never once used the term Blue, Spasmodic Cholera. With such symptoms present, could any one have doubted the existence of Cholera in the common acceptation of the word? Had not many witnessed such cases terminating fatally? Was it not, therefore, imperative on me to give the world the fruits of my experience and thus add my humble mite to the collection of remarks which had been made from time to time regarding this fatal and mysterious disease? I announced, that whenever my remedies failed in my own hands, I should be the first to state the fact, and in August of the present year, I had an opportunity of convincing the profession and the public that I was sincere in my promise; I need only quote in proof of this, the paragraph which appeared in the Delhi Gazette:—"In my work on the principal diseases affecting the health of the European and Native Soldiers in the N. W. Provinces and in the Medical and Surgical Journal, I had advanced the fact, that my treatment had been successful in every case of Spasmodic Cholera; the truth of this assertion remains unshaken; but in the very first case of Genuine Blue Spasmodic Cholera, such as it appeared at Subathoo as early as June, though the Epidemic did not fully develop itself until the 7th of August, I found the treatment totally useless, and the cause of this was manifest, since death took place as it has done in every subsequent fatal case, from effusion of blood into the cavity of the skull; while the heart was filled with the blood peculiar to Blue Cholera, and every viscus of the body congested with the same; and the adoption of any mode of treatment to such cases was about as useful as if one had taken a corpse from its coffin and tried to resuscitate it; in one case we were working on a living corpse, so far as matter was concerned; in the other, on dead animal matter, and the success in both the same!"

About the time that the Blue Epidemic Cholera visited Subathoo, a popular and highly distinguished writer in the Delhi

Gazette had made some remarks in his amusing letter to his loving cousin "John Bull" regarding Cholera, and attributed to jealousy and other motives the unwillingness of other Medical men to adopt my treatment.

These remarks were sure to raise the ire of the profession, even had my treatment been successful in Blue Cholera; but when I announced the fact myself that it was not so, it may be easily conceived with what avidity some of the members of the profession seized the opportunity of giving vent to their feelings on the subject! My treatment was denounced as useless, pernicious and so forth. "BRAHMINEE BULL," for such was the name adopted by the talented writer in the Delhi Gazette, on seeing the remarks so freely made by the Hostile Doctors, returned to the subject in his next letter, and founding his arguments upon the announcement which I had made, pointed out the unfair advantage which had been taken of my own candid confession and maintained that my treatment was designed for one particular kind of Cholera, and that a distinction had been made.

The distinction was attacked, and it was termed "quibbling" "subterfuge." Here was, according to the anonymous writer, a distinction without a difference! I had said nothing about the kind of Cholera I had boasted of curing! It might be Sporadic, Epidemic, Endemic or Spasmodic! I had, at length, failed by my own confession, and the B. B. must be made to feel that he had taken upon himself the discussion of a subject regarding which he knew nothing and the Doctor who recommended Croton Oil and Opium must be punished by a few side strokes for his presumption in teaching the learned profession how to deal with a disease which had baffled all the Physicians of Europe and it was exultingly hinted, that had a cure for Cholera been within the range of Medical knowledge, it was not likely to have escaped the penetration of the Great Medical men of Paris!

To reply to anonymous letters of this description would have only served to involve me in an endless discussion, and, though, the letters might have, for a time, amused the public, yet a sur-

*felt must have been the ultimate effect regarding a question of a purely professional character.**

Though thus, avoiding a Newspaper controversy with anonymous writers, I do not, in the slightest degree, blame those who have taken up the subject. I candidly confess, and every honest, conscientious Medical man is bound to do the same, that if any treatment be recommended, and it happen to fail where it appears applicable according to the author's own views of the subject, a doubt should, naturally, arise regarding its infallibility, or, in other words, its removal of the essential cause on which the disease depends.

I found that every case of Cholera which I had met with in the hills or plains, among natives and Europeans, had invariably yielded, and a reference to some of those published will show, that they were not slight ones, but such as generally prove fatal under any treatment.

This is allowed by the Reviewer in the April No. of the Medical and Literary Journal, and even by one of the anonymous writers, who actually states in one of his letters, that in a hopeless case, where calomel and other drugs had failed, Croton Oil and Opium were had recourse to and recovery took place!

What conclusion was to be drawn from this case? The pulse had ceased, but yet returned after persisting in my remedies, and the case must either have not been one of Cholera or the remedies effected a cure in a hopeless case where others had failed. The object of the writer in alluding to such an instance of a cure was evidently to show that B. B. had not been just in

* There is a precedent, however, for making even Cholera the subject of a Newspaper, and a very interesting work called the "Cholera Gazette" issued from the Press of Philadelphia in 1832, devoted entirely to the subject. Should the Epidemic appear again in the N. W. P. it might be worth the consideration of the spirited Editor of the D. G. whether or no, a similar paper could be started. If he should decide in favor of it, the portion of the public who felt interest in the progress of Cholera could be thus satisfied, without troubling the public in general with the learned lucubrations of anonymous writers. If any difficulty should arise regarding an Editor, such might be found in the person of Gynah Bullock, unless the latter aspires to the place at present occupied in the literary world by the talented and accomplished B. B.

supposing that other Medical men had not tried my remedies, but while thus endeavouring to prove the minor point, he actually supports the major, namely that the Croton Oil and Opium do cure Cholera where other remedies do fail, and this is all I ever contended for.

It is a somewhat curious fact but nevertheless true, that Medical men in India, at least, in order to try my treatment, have used calomel and other drugs usually employed, and thus allowed the disease to advance to a hopeless state before they had recourse to the Croton Oil and Opium! We can easily guess at the degree of astonishment evinced by the Medical man under such circumstances, when he found the pulse returning, and I confess, that I have never been so much astonished and satisfied, as when, in collapse from common Cholera, I have felt the pulse fluttering and returning to a cold clammy wrist, and the warm, profuse perspiration taking the place of the cold, clammy sweat of death, and all this in a few seconds after the free action of the stomach from repeated doses of the Croton Oil and Opium.

I have been informed by a Medical Officer who was not at all inclined to put faith in my treatment, that he himself refrained from exhibiting the Croton Oil and Opium until all other remedies had failed; in plain terms, that he was determined to try my remedies in a hopeless case where no human means have ever availed, and probably never will! It was the old adage "kill or cure," for he could not imagine, much less believe, that 40 or 50 drops of a poison like Croton Oil with 30 or 40 grains of Opium could be given without producing fatal consequences, and a strong objection is started by "Esculapius" I believe, (not the ancient father of physic) that the repeated large doses of Croton Oil, instead of curing Cholera, have been observed to produce inflammation of the stomach! It does not require much acumen to discover this, I never asserted the contrary, and both this writer and others overlook a very important point connected with the administration of two poisons, the one killing by inflaming the stomach and the other by its narcotic effects on the brain!

A minim or even half a drop is laid down and very justly as the dose of Croton Oil when used as a purgative; and could any Medical man suppose for an instant, that the eminent men who give this as the safe dose could be ignorant of the pernicious effects of giving 5, 10, 15, 20 or even 40 drops! And here is a humble individual, a Surgeon in the East India Company's service who can barely reach the Corbynian style of putting his ideas before the public, recommending such monstrous "heroic" and poisonous doses! It is hardly fair in a preface to enter so far into the subject, nor did I intend doing so; but I believe that the public expected me to defend myself and my worthy friend B. B. and this preface is meant to supply the place of lengthy answers through the same medium as that employed for the letters of B. B's assailants. I am mistaken if the remarks, here made, will not produce as great a degree of conviction on the minds of the public and the profession in general, as if they were published in a Newspaper by an anonymous writer. I readily grant that they may possess fewer pretensions for the amusement of the public, but the public and the profession are perfectly aware, that Blue Cholera is any thing but an amusing subject!*

But. to return to the discussion of Croton Oil and Opium.

It is a well known fact, that if Croton Oil be rubbed on the skin, it produces inflammation and pustules. If taken, in any large quantity, into the stomach, it will cause irritation and inflammation of its mucous coat, as well as of the lining membrane of the gullet. It is a medicine not to be trifled with; this is allowed on all hands. What on the other hand is Opium? A narcotic poison which is used like many other poisons as a powerful medicine. Does any Medical man, therefore, suppose, or if he do, he is a madman, or fool and not a Physician, that

* I am very much flattered at being compared to so old and tried a Writer as my friend Corbyn, tho' the comparison was not meant to raise the merits of either of our compositions with the public! N'importe, "nil desperandum."

repeated large doses of either Croton Oil or Opium could be given with impunity or without causing death, the one by producing gastritis, and the other by narcotizing the system?

How then does it happen, that I have ventured to give 5, 10 and even 40 drops of Croton Oil and 3, 6, and even 30 grains of Hill Opium since both are confessedly poisons in much smaller doses, and the profession is told, that a drop or even a half is the safe dose of the former? I candidly grant all these premises, but the conclusions as regard terrible and fatal diseases require a little more research than is requisite to learn the doses of medicines, and the supposed virtues of many which entirely fail in producing any decided effect. It is necessary to watch Fever, Cholera and Dysentery at the bed side of the patient, observe symptoms carefully, examine into the essential cause and the remote exciting and predisposing ones, the effects of all these on the living body effects of all these on the living body and on the dead. When the physician thus employed finds that on the supposition of a certain train of symptoms being set up by a certain set of causes, he is enabled to remove the former and cure the disease, it follows on the sure principles of induction that the latter have ceased to act. This is true in a general sense, but in medicine we must not only employ reasoning and warrantable conclusions, but put the latter to the test of experience, and if we trust solely to the former we may become ingenious theorists, and if to the latter celebrated Quacks, but never skilful or safe physicians. The true practice of medicine must be founded on sound reasoning and warrantable conclusions supported by experience, and this not in a few cases but in every one that we meet with. Having formed the opinion in 1841, that the emptying of the gall bladder was a matter of importance in the treatment of fever, and intimately connected with the essential cause of the disease, I resolved on trying the effect of a combination of Croton Oil and Opium. It succeeded in obtaining a state of Apyrexia in the worst cases of remittent fever, which had baffled the powers of Calomel, though given to the extent of inducing dry Gangrene or the death of the solid

parts of the body. I gave 5 drops of the Oil and 3 Grains of Opium. Both were large doses of the respective medicines, but evidently not poisonous when combined, as neither Gastritis nor narcotism was produced. Thus far as regards fever. But though the Kurnaul fever was a most fatal disease as the records of the Superintending Surgeon's office for 1841-2 and 3 can testify, there was a still more fatal one which might appear; namely, Cholera, and finding that in this disease there was universal congestion present in every case that proved fatal, I was induced to believe that the remedies which removed the congestion in fever might, if pushed to a greater extent, remove even the essential cause of Cholera, if depending on congestion. I mentioned these views to an eminent member of the profession before I had recourse to the remedies in Cholera and he so far coincided that he owned the Theory was a plausible one,

The Croton Oil, I was well aware, would produce great irritation and perhaps inflammation if pushed to a great extent by itself, and the Opium under similar circumstances must cause deleterious effects on the brain, but there was a disease to be overcome which had baffled ordinary means and there was in this disease both congestion and great prostration of the nervous system; these circumstances might render the drugs in poisonous doses remedial means, and the irritating effects of the Oil in the stomach might be counteracted by the opium, and the narcotic effects of the latter by the cathartic properties of the former.

Here then is a plain statement of the case, showing that though 40 drops of Croton Oil may poison by inducing inflammation of the stomach, and half a drachm of Opium be equally fatal on the brain, yet by combining the two medicines the pernicious effects of both are reciprocally counteracted.

Such conclusions, though manifest, still require the proof of experience, and happily it was found that these two poisons might be administered to almost any extent without causing death when such a disease as Cholera was present, nay further that they removed the essential cause of the disorder and cured Cholera.

Even allowing that want of pulse, cold clammy skin, vomiting purging, spasms, incessant thirst and the like were but indicative of slight disorder in the system and could not be called Cholera, yet such Symptoms had been found to terminate in death, and they were removed by Croton Oil and Opium. The term Cholera is generally applied to such a train of symptoms and, therefore, Croton Oil and Opium did cure Cholera. Further, death was not caused in a single instance by the drugs and though the anonymous writers sneer at Croton Oil, as if it alone had been the sole remedy, they will now see and confess, if they be the ingenuous and honest men who compose the Medical service in India, that their sneers and strictures were uncalled for, resting as they did on a partial view of the case, and I trust I have explained the matter satisfactorily to my readers and proved the following points:—

I. That Croton Oil may, when combined with Opium, be given to an extent which, under ordinary circumstances, would cause death by producing inflammation of the mucous membrane of the stomach.

II. That Opium, when united to Croton oil, may be administered in doses that would in ordinary cases, destroy the functions of the brain, producing narcotism and death.

III. That this combination of Croton oil and Opium has removed a train of symptoms called Cholera with every symptom of Epidemic Cholera present save the Blue skin.

It would be premature in this place to enter into the subject regarding the two kinds of Cholera, but I trust I shall be able to prove in this treatise, that Sporadic and Epidemic blue Cholera differ in one essential feature which renders the one a curable disease, when there is even no pulse, and the other an incurable malady in the state of collapse by any mode of treatment at present known.

With regard to "BRAHMINÉE BULL," he is perfectly able to defend himself under ordinary circumstances, but in a question which involves deep medical research, it would be unfair to expect that he could reply to his assailants with any chance of success. He, in a friendly or rather philanthropic manner, maintained that I cured Cholera, and if he was misled, the fault was mine, though from the foregoing remarks the profession will see that neither B. B. nor myself was so much to blame as the anonymous writers in the Dehli Gazette would induce the public to believe, and I have not the slightest objection to the friendly B. B. making any use he may think proper of the foregoing portion of this preface, and I hope my readers will excuse its length, and allow me to finish it without any further allusion to the worthy "BRAHMINÉE" or his assailants. As to the latter, I do not anticipate conviction on their parts; nay further, I hope they will be like Goldsmith's "Schoolmaster" and return manfully to the charge. I have taken the pains to put them right on a few points, and I shall be at all times happy to see them publishing their views on Cholera or any other subject, and they are at perfect liberty to refute mine which, if not capable of standing a siege, are worth but little, and their Author deserves to hide his diminished head and no longer set up for a teacher!

I have only one more remark to make on this subject, and that is that being a mediocre writer in English, which is a foreign tongue to me, I hope the anonymous writers will overlook any errors in composition, and in return, if they will write in good broad Scotch I promise to allow them the credit of equaling the style of the "immortal Burns" as displayed in "Tam O' Shanter," though they class me with my worthy and esteemed friend Corbyn! I do not much care for their sneers at my poor composition, but I do feel hurt that they should have gone out of their way to aim a hostile, but I hope harmless dart at a Member of the Profession who was in no way connected with the subject at issue further than hav-

ing, like myself, been guilty of giving his remarks on Cholera to the world and having been one of the most successful in treating Epidemic Cholera in Lord Hastings' Camp! He is too old a Soldier to be disturbed by anonymous writers or their sneers, he can afford to laugh at both, and I hope to be able to follow so good an example and recommend the same to B. B.

Though numerous treatises and monographs have been written on Cholera by Medical men in different quarters of the globe, still in so fatal a disease as the blue kind undoubtedly is, the observations made on it when appearing as an Epidemic and spreading its fearful ravages over extensive tracts of country, must possess some interest and confer some benefit, if only one point be established, whereby its mortality can be at all diminished.

The trouble of compiling a treatise on such a subject is a task which no Medical man who has witnessed the disease in its Epidemic form should shrink from. Seeing then the fatal nature of Blue Epidemic Cholera, we naturally exert our ingenuity in discovering some means which, if employed at a certain stage of the disease, may tend to check its progress towards a fatal termination.

We are indebted to Mr. Annesley, late of Madras, for prominently bringing forward the stage of invasion in Cholera as the one in which our remedial means must be employed with any prospect of success.

It had been observed even in the worst cases which mean nothing more than that the disease had been allowed to reach the Stage of Collapse, that a free stream of blood from a vein checked the disorder, and Annesley inculcated the valuable practice of bleeding in the early Stage, or that of invasion as he very aptly calls it. Blood at this period can be ob-

tained, but if the disease be allowed to establish itself, none will flow, and death takes place in a few hours. Others have put this practice to the test, and with marked success.

The present treatise is not given with the view of offering any remedy for Blue Epidemic Cholera in its confirmed blue stage, but, to prove still further that the practice, here alluded to, is the only one, at all likely to be attended with success so far as our knowledge at present extends. The charge of a Regiment of European Soldiers has afforded me considerable opportunities of observing the Epidemic which visited the North West Frontier in 1845, and from thence spread its ravages to the Doab of the Jumna and Ganges. It continued to rage at Subathoo for upwards of a month, and during that period, a constant attendance at the bedside of the patients must naturally give some claim to attention for the result of such observations as were then made.

I wish some other pen had undertaken the task, but as this is not likely regarding a disease supposed to be thoroughly understood, I have the less hesitation in giving the fruits of my observations to the world. I trust to the kind indulgence of my readers for any error or oversight this treatise may contain, at the same time I can assure them, that facts are given, though I do not pretend to deny, that deductions drawn from them are not liable to fallacy.

A Medical Officer in charge of a European Regiment in India might be supposed to have but little leisure for such a task as that which I have now imposed on myself, but this is quite a mistaken idea, since there is no more useful and even pleasing mode of whiling away the lonely and dreary hours of night amidst the dead and dying, than that of committing the vivid impressions then formed to paper with a view of benefiting our fellow creatures of mankind. The man must be, indeed, callous to the best feelings of humanity who, under such circumstances,

can leave his patients to glide into their silent graves unobserved ; and though, one man cannot be always present, yet I was fortunate in possessing the zealous co-operation of my friends, Messrs Hinton, Faithfull, Glennie and Grant. Two of those gentlemen were sent from Simla at a time when some men would have shown a dislike to such severe professional duties ; Doctor Glennie was, actually, on medical certificate when ordered to relieve Mr. Faithfull. Such are the men who deserve well of their employers, and it is to be hoped that their services will not be forgotten. It is true, that every Medical Officer is expected to do his duty, and the performance of it, under all circumstances, is looked for ; but, when, we find a man, actually ill himself, giving his aid night and day during the prevalence of Epidemic Cholera, it would be unfair to conceal his exertions. Indisposition, on the part of Doctor Mawe, one of my Assistants, deprived me of his valuable aid, except during the early part of the Epidemic.

I must not omit here to mention, in a public manner, the ready and zealous aid afforded me by the Commanding Officer and his staff. Every suggestion given by me was instantly acted on, and to the vigilance on the part of Officers Commissioned and Non-Commissioned in watching the men, I am indebted for the successful adoption of the means found useful. To the subordinate Medical Establishment, I give my willing tribute of thanks, some of them wiped away, by their attention, the sins of former neglect, while others added fresh claims to reward and advancement.

I cannot deny myself the pleasure of mentioning, though my humble testimony is hardly required, the willingness displayed by His Excellency the Commander-in-Chief and the members of his Staff in the Adjutant General's Department to give full force to every measure recommended by me through the Commanding Officer, and no means, likely to benefit the Regiment, were ever objected to at Head Quarters. The same remarks are appli-

cable to the Major General Commanding the Division, and his Adjutant General, who received a daily report of the Epidemic, and took the liveliest interest in every thing which could tend, in the smallest degree, to remove or diminish the scourge. When I mention Mr. Jackson's name as the Superintending Surgeon of the Division, my readers will easily believe that from him I received every aid which his valuable advice could afford.

Though last not least, I cannot close this preface without alluding to the incessant care bestowed on the spiritual comforts of the sick by the Reverend Mr. Vaughan, and the Reverend Father Vincent, the duties of the latter gentleman were of an arduous kind, and amidst the dying at Subathoo, Kussowlee, Loodianah and Umballa, his cheering voice was heard when all earthly means had failed; and could give a hope which extended beyond this transitory world. It was pleasing to see the benevolence and Catholic Spirit of this worthy man making no distinction between his own flock and the Protestants, but dealing out to all the words of consolation and hope, and no doubt, many listened to him then who had previously turned a deaf ear to his councils.

INTRODUCTION.

IT is well known the dread and apprehension produced by the Asiatic Cholera, as it was significantly termed, when it visited Europe and America in 1831 and 32. For fifteen years previous to that period, it had been well known in India, and those who served in 1817 with the Marquis of Hastings will not easily forget its ravages in his camp. The celebrated French Physiologist Majendie vividly describes his impressions when visiting England for the purpose of witnessing the disease; all his former ideas of it were overwhelmed by the reality, and he could not picture to himself a disorder in any way commensurate with the fearful one then prevailing, which put medicine at defiance, and whose approach was the harbinger of death, not by slow degrees like other disorders, but with a rapidity which astonished the stoutest hearts. All rules of practice were overlooked, and every mode of treatment adopted, but still this dire and terrible disease swept off its victims like a devouring plague. It had been supposed, that the East was the peculiar residence of the scourge, and that a cold and temperate climate was incompatible with its existence; and at first it was doubted, if the disease which appeared in the temperate climate of England and the cold stormy regions of Russia could possibly be the Asiatic Cholera. The point was soon decided, and it was speedily discovered, that it was equally fatal in Eu-

rope as in Asia, and that it was in both quarters of the globe the same fearful, mysterious disease.

Ingenious theories were formed regarding its nature and cause, but none of them tended, in any degree, to suggest remedial measures at all capable of arresting its progress. The treatment was strictly empirical, and every article in the pharmacopeia was brought into requisition, but in vain. There lay the victim with his blue skin and cramped body, while incessant thirst, unquenchable, tormented him and a few short hours saw him a lifeless corpse in spite of every endeavour. The Medical profession was spurned and its votaries hooted, abused and even murdered! The frightful scourge appeared as if sent to put earthly means at defiance, and show how limited our powers were, when contending with this king of disease whose nature we could not comprehend, and whose progress was beyond our control. Every one was panic-struck, and fear seized on the stoutest hearts when seeing their wives, brothers, sisters, sons and daughters all falling victims around them to a merciless Epidemic. Seas, Rivers, continents, were no barriers to its progress, and it was in vain to flee from it. Glutted at length with innumerable victims, it ceased its ravages in Europe, and crossed the Atlantic to the new world where its ravages were equally great.

Since that period, it has appeared as an Epidemic at several stations in the N. W. Provinces of India, but it was not until the present year, that it traversed the countries beyond the Indus from the confines of Persia through Affghanistan, the Punjab, the North Western Frontier and to the elevation of Subathoo, Kussowlee and Simla; no place in this tract has escaped it, and Ferozepoor, Loodianah, Umballah and the Hill stations were successively visited by the Epidemic during the months of June, July, August and September, while its ravages extended in the latter month across the Junma to Saharunpore, Meerut and other places in the Doab. It presented every where the same deadly aspect. It spared neither age nor sex; the strong and the weak were alike its victims. The losses in all the European Regiments have been great, and the ranks of the gallant corps on the Frontier have been terribly thinned by the all devouring scourge.

The loss of life in Affghanistan and the Punjab cannot be ascertained, with any degree of certainty, but the tables in the Appendix will show the amount of deaths among the European Troops on the Frontier.

Though thus deadly, the mortality falls short of that produced by the fever of 1841 42 & 43 at Kurnaul, and the sequelæ of cholera in men who recover are trifling compared with those from fevers and dysentery. It kills more rapidly, but not more surely than these complaints, though happily we can oppose the latter by remedial means in their early stages; and even in Cholera, when in the stage of invasion, the Lancet is effectual in an equal degree, and perhaps more so than in Fevers; the only difference being, that we must use it before the disease is fully formed in Cholera, whereas, in Fevers, the symptoms may be well developed before our remedial means are brought into practice.

We must, therefore, study the treatment of Cholera in its early stage, and not when developed; in the one, it is a manageable, in the other a fatal and unmanageable disorder. This great truth must never be forgotten, else we shall try, in vain, to check its progress when appearing in the virulent form which the disease assumed in 1845.

It is well known to the profession, that two distinct species or varieties of Cholera exist, one named the common or sporadic, the other the true Epidemic Cholera or Asphyxia, the one is a manageable disease and generally curable, the other incurable in the state of collapse.

I do not mean to assert, that cases of confirmed Blue Epidemic Cholera do not recover, but I believe I may venture to affirm, that the efforts of nature in producing a re-action, and not our remedies are of use, though much may be done in moderating this re-action which, in too many instances, is partial, and of itself produces death when confined to the brain. When less partial, and extending through the system causing a febrile state, the prognosis is favorable, and we may hope for recovery. But these are rare exceptions, and the general rule holds good, that in the confirmed stage of Cholera, such as it appeared in the present Epidemic, the case is hopeless.

We are apt to forget impressions, and no sooner has Epidemic Cholera subsided, than we begin to fancy that we have cured some cases, and such is no doubt the case, but the number is very few, where the pulse had disappeared, the universal blue skin existed with incessant spasms and an absence of all secretions ; and on a recurrence of a similar Epidemic, we are doomed to experience, how sadly mistaken we were in supposing that we had cured confirmed cases.

In giving, therefore, Tables and Returns, an erroneous idea is conveyed by marking so many cured, unless we distinctly describe the existing symptoms. We shall otherwise mislead ourselves and others by supposing, that after the blood has completely undergone the change which appears to destroy its vitality, our means had restored the latter : we even know in what ingredients the blood is deficient, and by throwing a little common salt on the blood taken from the heart of a person dead from Cholera, the florid colour of the blood is restored, but what good is hereby gained ? We may inject saline solutions, but this is a mere mechanical action set up to restore a vital one, and without the latter, no permanent effect can be expected.

TREATISE
ON THE
BLUE EPIDEMIC CHOLERA.

CHAPTER I.

***General Observations on the Blue
Epidemic Cholera of 1845.***

The progress of the Epidemic Cholera of 1845 was well marked. It was first heard of on the frontier in the month of June, when it appeared on this side of the Sutledge after traversing Affghanistan and the Punjab. It next reached Loodianah and simultaneously Umballa! The rainy season on the North Western Frontier was marked by a long interval between the falls of rain, and the absence of thunder storms. There was at the altitude of Subathoo, a hot, disagreeable feeling in the air; the body felt heated, even within doors. So early as June, a case of Blue Spasmodic Cholera occurred in the 1st Light Infantry; it resisted the means found successful in every case of Sporadic Cholera. No other case occurred until the 8th August, when the first appeared in the Rifle Barrack in the person of Private Mayne, who had just been discharged from Hospital, where he had long suffered from bowel complaint. Previous to this, however, a treasure party from the Nusseere Battalion had been attacked with the Epidemic Cholera at the foot of the Hills, and ere it reached Subathoo, several had fallen victims to it, the people in the Bazar at Subathoo were speedily attacked, and from that locality, the disease travelled up the Hill and appeared in the first Barrack (the Rifle) on the 8th August; what may appear strange,

and certainly militates strongly against the contagious nature of the Epidemic, was, that not a man on duty over the Subathoo Treasury was seized with the complaint, though mixing freely with their companions who had arrived with the treasure. The disease next appeared in the lower Hospital, and in the Guard Room of the Canteen, from which three or four men were brought in the stage of collapse and speedily expired. The Canteen Sergeant was himself attacked, but fortunately was brought in time and his life preserved. After this, the Epidemic attacked men in the different Barracks with the exceptions of Nos. 2 and 5. The latter was built on a higher spot than any of the others, and did not suffer previous to the return of the men from camp to which they were removed with a view of having the Barracks white-washed and fumigated, as well as to remove them from the locality of the Epidemic; whether it had the latter effect, may be doubted, for several cases were admitted from camp; and the men were brought back to the Barracks where both Nos. 2 and 5 Barrack, which had previously escaped, were brought within the range of the Epidemic. About this time, the Epidemic appeared at Kussowlee, where it attacked several men of H. M.'s 9th Regiment and proved to be the same deadly disease as it had been at Ferozepore, Loodianah, Umballa and Subathoo. H. M.'s 31st Foot suffered severely, and the Regiment went into camp, but from exposure to damp and other local causes, the men were soon brought back to their Barracks.

During the whole time the Epidemic continued at Subathoo, and the same was, I believe, observed at Umballa, the disease appeared to rage on the wind shifting to the East; while the prevalence of a westerly wind seemed to exert a beneficial influence. At Muttra in 1838, Epidemic Cholera appeared on the 1st of April. The days were excessively hot, and the nights cold with a bleak southerly wind. The men of the Troop of Horse Artillery were encamped across the Jumna and the disease speedily ceased. But in the rainy season, the measure of encamping men is attended with difficulty, and it is doubtful how far it may be beneficial, as they cannot be narrowly watched, and are, besides, necessarily exposed to rain damp. During the movement, cases must be lost, and the same is true of their return to Barracks. The peculiar

feature of the Epidemic was the apoplectic diathesis, which accompanied it and rendered remedial means of little avail, unless employed early. Its tendency to attack patients in Hospital labouring under other diseases was, likewise, well marked, and nearly every one thus affected fell a victim to the Epidemic ; this was observable at Umballa and other stations, but the circumstance need not create surprise, since the complaints under which such men laboured gave a strong predisposition to Cholera, which became, in fact, the sole existing disease, all others merged into this.

The progress of the disorder was very rapid, many dying in four hours from the time in which the stage of collapse was well marked. One very extraordinary case occurred in a man who had delirium Tremens with some of the symptoms of Cholera ; the latter were kept in check until, by repeated doses of Laudanum, tartar emetic and the like, he fell asleep ; but, on his awaking, the stage of collapse was established almost immediately and he died in a few hours. In one case, the passions of the mind appeared to have a wonderful effect, the man was very much affected on making out his will and leaving his hard earned wealth behind him. The exertion appeared to produce reaction, and he eventually recovered ! Whether this might be turned to any good account is doubtful, tho' it appears reasonable to expect some effect from any thing which can rouse the energies of the mind and nervous system ; and the use of Brandy and stimulants is founded on this.

Another curious case may be mentioned, it was that of a female whose child was dying, and regarding whom the poor woman was very anxious, forgetting her own sufferings in those of her child, the latter died, but the mother rallied, and the symptoms subsided.

Though it is said, that women are more liable to the disease than men, yet I have found that during the present Epidemic, though the rule held good, yet the reaction in the former was often followed by recovery, whereas in the latter, death generally ensued, and the females, thus affected, were weakly subjects, and consequently not so liable to die of apoplexy which was the immediate cause of death in every fatal instance. Age did not appear to exercise much influence, as the young and old soldier were alike the vic-

tims of the epidemic. Men of intemperate habits were certainly more liable to the disease, and several cases occurred of temperate men who took to drinking from a dread of the disease, being seized with it after the excitement produced by the spirits had subsided. Through the praiseworthy exertions of the commanding officer, the men were latterly restricted to two drams daily, and the good effects of this moderate allowance were speedily seen and allowed by the men themselves, not as only regarded their bodily health, but also their moral conduct in the Guard reports being blank. It would be a great blessing if this restriction could be carried into force in all European Regiments, particularly in the hot weather and rains ; the subject is one well worthy the serious attention of Government. Excesses of all kinds prove powerful predisposing causes during Epidemic Cholera, and none more so than hard drinking. We can only account for the immunity among the European Officers from care in their mode of life : for their duties lead them within the range of the same exciting cause which produces the disease among the soldiers. Indigestible food, particularly bad bread, is a fertile source of disorder in the stomach and bowels which always predisposes to any prevailing Epidemic ; and I may here state, that the quality of the bread supplied at Subathoo has been always bad, and such as many men could never digest. Bad beef and mutton must also contribute to the number of cases of Epidemic Cholera, and has no doubt done so during the present visit of that disease.

The Epidemic visited Simla during the months of August and September, but was confined to the Natives, who were panic struck and left the place. At Subathoo, the Hillmen also ran away, and it was difficult to keep Jhanpanees. Among my own, one man was seized with the Cholera, while sitting beside me at the door of the Hospital. I insisted on bleeding him directly, telling him, at the same time, that he would die like the Natives and Europeans if he did not consent. After a great deal of entreaty, he acquiesced, was bled freely, and his stomach being well cleared out, he was at his work in four and twenty hours. The result was fortunate, for had he escaped my hands into the bazar, and there died, I should have been deserted at a time when the men's services were in hourly requisition. My friend Dr. Glennie, by

promptly opening the temporal artery in a young lad, a native of the Hills, saved his life. There is apt to be a despondency among Soldiers when they witness their comrades carried off daily, and they begin to lose confidence in Medical treatment, and resort to drinking ; such a feeling, I am happy to say, was not observed among the Soldiers of the 1st European Light Infantry, and when they saw every man recover who applied early, they were ever ready to enter the Hospital. In camp, they amused themselves with music, singing and dancing, and such ought always to be encouraged. Any amusement, short of intemperance, has a beneficial effect during an Epidemic, and nothing tends more to bring on the disease than low spirits, or a dread of its approach. Every man seized with the Cholera was cheerfully attended by his comrade, though instances occurred where the latter were themselves attacked. Amidst the ravages committed at the early period of the Epidemic, not a whisper was heard in the Hospital, and every voice was hushed, and every man behaved with exemplary decorum, they were allowed to smoke, which is of service in so far that it gives a supposed or real immunity from infection and need not be prohibited during the prevalence of Epidemic Cholera.

Though the Epidemic did not appear in the cantonment of Subathoo before August, if we except the case of Private Reily so early as June, yet in the villages close to the place, it had been raging for several days and, even weeks, and I gave medicines repeatedly to the Tuseeldar for distribution. When it appeared in the Bazar, a subordinate Medical Officer was sent there, and an Assistant Surgeon occasionally visited the people. The existence of an old Bazar in the centre of Cantonments and one in a filthy state, no doubt contributed to the sickness, and it is to be hoped such a nuisance will not have a long duration.* The grass on the Hill was all removed and burned, and this measure should be adopted every year in all situations where grass is rank. The Barracks inhabited by European Soldiers should be airy, and the floors either boarded or terraced. The site of the Barracks at Suba-

* The order has been issued for its removal.

thoo might have been better, and had they been built on the ridge above the road leading to Simla, they would, at all times, have been open to the westerly breeze which sets in about noon. It is a lamentable fact, that in choosing a site for Barraeks, too little consideration is given to so important a subject, and none should ever be erected without a Committee of experienced Medical men. The same remark applies to Hospitals. As a useful means, I recommended the use of Coffee or hot soup every morning, and such should always be prepared for the men; for if left to themselves, they will not take the trouble. As a means of keeping up the tone of the nervous system, I gave the whole Regiment Quinine for two days, but my supply failed me. In case of Epidemic Cholera again occurring, I should be inclined to follow the same plan, and as to the expense, it must be remembered that the loss of each man is £100 Sterling or 1,000 Rupees. In jungly countries, and where Fevers prevail, the use of Quinine should be adopted as a preventive.

The Epidemic, though visiting Kussowlee at a later period, disappeared there and at Subathoo about the same time. It is supposed that the Epidemic Cholera becomes less virulent, but I believe that this opinion arises from the cases being better watched and brought earlier for treatment. I found that the same means were equally called for at the breaking up of the Epidemic as at its outset, and that if neglected, death was as sure to follow.

It is observed, that violent Fevers succeed Epidemic Cholera, they appear to be the violent reaction of Cholera without the stage of collapse being well marked, or observable, there being only a little shivering or a fit of rigors. Such Fevers have all a tendency to effusion within the skull, and require the free and early use of the Lancet as well as leeching, shaving the head and other antiphlogistic measures; under such treatment, I did not lose a case between the time the Cholera ceased and the end of October, when the Fevers themselves disappeared. Part of this success may, no doubt, be attributed to the cool nights enjoyed at Subathoo during the period alluded to, and in fact throughout the rainy season, in ordinary years. The first half of the year 1845 was particularly healthy at Subathoo, though previous to the appearance of Cholera, the Measles prevailed, and some of the little

patients who had escaped the one disease fell victims to the other. On the other hand Fevers and Dysentery were, by no means, so common in June and July, as they had been in 1843 and 44, and had it not been for Epidemic Cholera our mortality would have been trifling as compared with those years, but the fearful Epidemic has turned the scales, and the amount of deaths in 1845 will exhibit a great balance in favor of it. Had Kussowlee and Simla remained exempt, a just outcry might have been raised against Subathoo, but as things have turned out, the latter must be considered an eligible situation for Troops, since its cool nights give a facility of treating Fevers not enjoyed in the plains of India, and from October until May nothing can exceed the fineness and healthiness of the climate. Another year's residence at the place will, it is to be hoped, restore the Regiment to perfect health, and I trust the Epidemic Cholera will not again pay us a visit.

Having made these general remarks on the Epidemic, I shall now proceed to consider the disease in regard to its stages with the symptoms attending each, its Pathology, causes remote, and proximate, and its treatment with a few concluding remarks.

CHAPTER II.

***The Stages of Blue Epidemic Cholera
and the Symptoms attending each.***

When Epidemic Cholera visited Europe, the disease was generally described as consisting of two stages, namely, those of collapse and reaction. These might give a correct idea of the disease, as far as symptoms are concerned, but went no way in assisting us in its successful treatment; in order to check this deadly disease, we must divide it into three stages, viz. the Stage of Invasion, that of Collapse, and that of Reaction. With regard to

the first, or, that of invasion, it is well marked, where the Epidemic prevails, by the slightest ailment, no matter of what kind, all merge, sooner or later, into the disease. From not attending to this important truth, both patients and Medical men have been woefully deceived into a belief, that there is nothing the matter when a man merely complains of a slight looseness, a foul stomach, want of appetite, uneasiness about the Præcordia, some oppression of breathing, giddiness, singing in the ears, all these and many others are the premonitory symptoms, and constitute the stage of Invasion which is the one of most importance, for, if overlooked, the second or that of Collapse succeeds in which our means are unavailing, or to say the least, very uncertain. It is impossible, at the first breaking out of Epidemic Cholera, to tell that a man affected with any trifling ailment is about to have Cholera ; but, after the first well marked case, which puts at defiance the means capable of removing *common Sporadic Cholera*, has occurred, we may rest assured that all symptoms of ailment will merge into the disease, if the individual be within the sphere of the remote exciting cause. This has been exemplified in a most wonderful degree during the present Epidemic, and in not a single instance have I been deceived in the importance attached to these premonitory symptoms which mark the stage of invasion. Fortunately, one fatal example was sufficient to impress its truth on the Soldiers. Private O'Rourke was sent much against his own will to Hospital ; he had no symptoms of illness, save a little nausea, and the peculiar look which is indicative of approaching disease. He was bled, and after remaining a day or two in Hospital, insisted on going out. I warned him of his danger, and told him that though the disease had not yet manifested itself, it might do so suddenly, and he was lost ! Next day, he was brought to Hospital at 10 o'clock in the morning in the stage of collapse, and died in four hours ! This was a sad and fearful warning, and made an impression highly useful, as no man after it ever asked to leave Hospital until he was out of danger. We are indebted to Mr. Annesley for the importance to be attached to the stage of invasion, and when it is proved by every day experience, that the case is hopeless in the second stage, surely all our efforts should be directed to this first stage. There is, fortunately, no difficulty in doing this, and in

Epidemic Cholera our business is to watch this stage, and apply our remedies, and not wait, until a blue skin and cramps appear as convincing and deadly proofs, that we have allowed the disease to pass beyond our control. In some, this stage of invasion may continue for hours and even days ; a slight diarrhœa may be present for a longer or shorter period, and little attention paid to it, until suddenly, giddiness and ringing of the ears occur with vomiting, loss of pulse, blue skin and spasms. Hardly a case occurred in the 1st European Light Infantry that the individual could not trace to some supposed cause connected with his food or drink, suppressed perspiration, and the like ; these were merely predisposing causes which must exist in some and be wanting in others, else every individual within the range of the remote exciting cause would be afflicted ; the same is true of all diseases. As a general rule regarding the stage of invasion, every ailment or indisposition occurring to individuals within range of the remote exciting cause marks the approach of the disease ; and none, however slight, must be overlooked. The symptoms which distinguish the first stage arise, no doubt, from the important change which the blood is about to undergo, and which manifest themselves in the three great cavities of the body in the form of general debility, giddiness, ringing in the ear, inability to stand, oppressions of breathing, uneasiness about the præcordia, looseness, nausea, loss of appetite and a feeling of being unwell, without being able to say with what.

The second stage, or the first of most authors, is named collapse, and in it there are permanent symptoms which never cease, depending on vital actions, and others which may be present and subside, or be altogether absent in the course of the disease. The four permanent symptoms which mark the stage of collapse in Blue Epidemic Cholera are ; First.—The absence of a pulse in the radial artery, and as the disease advances in the other arteries of the body ; for, as death approaches, the branches of the temporal arteries, though standing out in bold relief like whip cord contain lifeless blood and give no pulsation.

Secondly.—The blue skin ; this pervades the external surface, and after death, gives a blue tinge to the brain

itself seen through its membranes ; it is a sure index of the change in the blood, and gives a never failing feature to the disease ; when once formed, it never subsides, unless, reaction and recovery take place.

Thirdly — The cold clammy skin. This feeling gives the idea of a corpse, and when once experienced can never be forgotten.

Fourthly. — The want of all secretion.

These four symptoms, when once present, never cease, they are permanent, and distinguish Blue Epidemic Cholera from all other diseases, though, in general, others are fixed upon in describing the disease, but they are not permanent, though usually present. In every case of true Cholera, vomiting, or nausea, incessant thirst, looseness of the bowels and spasms are generally present, but towards the fatal termination, the patient often lays without exhibiting any of these symptoms, but the pulse never returns, the skin remains cold, the blue colour of the body is present and no secretion takes place.

With regard to loss of pulse, it was remarked that in those cases, where men were seized with the Epidemic in Hospital while labouring under any other complaint, such as Diarrhœa and Dysentery, the pulse generally continued to be felt, though feebly, for a longer period than in those admitted from Barracks or Camp. When the treatment has been early adopted in the stage of invasion, the heart is at once relieved and a portion of blood abstracted, which enables it and the lungs to act in propelling the blood and arterializing it ; but, if the disease has advanced to the stage of Collapse, the blood has lost its vitality, and the heart is unable to circulate it and the pulse never returns, until the change in the blood is removed. The cold clammy skin is accompanied by a cold tongue, and a cold state of the expired air ; these are present in common Cholera, so is the clammy skin in Collapse from Fever, Dysentery and other diseases, nay, the pulse may have disappeared in these, and there may be spasms in common Cholera, but the symptom which at once distinguishes true Epidemic Cholera from all other diseases and the Sporadic kind itself is the *blue skin*.

Purging is present in every case of Epidemic Cholera, and in most instances, ushers in the disease in the form of a looseness or Diarrhœa; and the dejections consist of a thin, whitish fluid bearing a striking resemblance to water in which rice has been boiled called *Conjee*. This kind of watery dejection alone is very characteristic of Cholera, and when it occurs during the Epidemic, is a sure premonitory symptom and must never be neglected. When the vomiting occurs in Cholera, the contents of the stomach are generally brought up first; efforts at vomiting continue with the *Conjee* stools and cramps; but, towards the fatal close, when the irritability of the muscular system has been completely exhausted, there are neither spasms, purging or vomiting; both the vital powers and muscular irritability are exhausted and the vomiting, purging and cramps are produced by the inherent power of irritability possessed by the muscular fibres of the stomach, bowels and the muscles of the trunk and extremities. It has been observed, that cases where the Spasms are not well marked, and little of vomiting or purging is present, are equally fatal, if not more so than those in which they are prominent, and we can readily see how this should be, since the muscular irritability was quickly exhausted in the former case, and was stronger and continued longer in the latter.

From the time when the blue skin appears, the Pulse ceases, the skin becomes clammy and no secretion exists, all depending on the vital actions, the individual is a living corpse; and though the inherent irritability of muscular fibre sets up vomiting, purging and cramps, there is about as little chance of recovery as if one produced the same actions on a dead body, nature sets up in such cases a reaction which is the third stage of cholera, but usually named the second. The stage of reaction in this disease is one of the most extraordinary phenomena connected with it. Instead of its being like that witnessed in fevers, where the body becomes hot and the pulse beats strongly, the reaction in Cholera is marked by heat of scalp, generally intense, and felt first at the crown of the head; but so far is it from being the harbinger of recovery, this partial reaction is speedily followed by oppression in the breathing and frequently coma; during the present epidemic, life has been prolonged, and recoveries have occurred after reaction but chiefly in weakly females and

children. Some men have lived many hours after the reaction set in, but this was apparently caused by repeated leeching of the head, chest and abdomen; and the flow of even a couple of ounces of arterial blood from the Temporal Artery had a wonderful effect; the patient opening his half shut eyes, and probably going to sleep and eventually recovering. Seldom, however, could any blood be obtained from the artery; while the leeches dropped off without abstracting any, and the patient sank rapidly. Could one have recourse to any means which would, during the stage of reaction, moderate the action on the brain, and its blood-vessels, as well as diffuse this action over the system, then recovery might be looked for. The application of leeches, in great numbers, appears to act beneficially in moderating the reaction within the skull, and if we could get blood from the temporal artery, the effect would be more marked; but this vessel and its branches are still filled with lifeless blood, and none will flow, as to opening a vein it is useless. Our means are, therefore, limited, and we are as yet ignorant of those capable of producing the two objects in view. In one or two instances, the fingers have become warm, and a few drops of urine have been passed; but still, the breathing has become suddenly oppressed, and death speedily followed the partial reaction.

In the stage of collapse, the eyes appear sunken, with a brown areola around each. The fingers are bent and the integuments over them shrunk, the nails are blue or bluish purple; the patient complains of something about the Epigastrium and Hypochondria, which he cannot get rid of; he is restless and tosses about, while incessant thirst and spasms torment him. The stools flow from his bowels as from a dead tube and the stomach rejects everything. The cold clammy sweat of death pervades the body, and we feel, in vain, for a pulse; and yet all these deadly symptoms are the work of a few seconds, and succeed to the slightest ailment marking the stage of invasion. If stimulants and escharotics be applied to the skin, the patient is fully sensible of them and often impatient of their action, begging to be relieved of a blister which may have been applied, and attributing his illness to it, even a few hours before death closed his eyes! Blisters, and even Nitric Acid, have not appeared to have the slightest effect in rousing the sys-

tem, so as to produce any effect on the vital actions, and they seem only to torment the patient. The same may be said of sinapisms. When the stage of collapse is intensely marked, and the pulse disappears suddenly while the blue skin is cold as marble, death often occurs in the space of a few hours without any sign of re-action. Where the blue skin is less intense, and the spasms moderate, re-action generally happens and the patient may live beyond twelve hours, and in one very prolonged case, he survived upwards of four and twenty hours, but yet the pulse never returned and the re-action was confined to the head, the scalp being hot unless, when cooled by cold applications and repeated leeching. It is probable that we possess no more certain means of moderating the re-action within the skull than the application of Ice to the bare scalp, and it is possible, but by no means certain, that the re-action might become thereby more universal. It is very extraordinary to witness the rapidity of re-action in Common Cholera, where every symptom is present, save the blue skin. No sooner has the stomach acted freely by repeated doses of opium and croton oil, than the pulse returns, and the skin, which was before covered with a cold clammy fluid, is enveloped in a profuse warm perspiration. Is this quick and effectual reaction to be attributed to the action of the stomach, or to the restoration of the tone of the nervous system? What prevents the same reaction in blue *epidemic* cholera from the adoption of the same means? This must arise, entirely from the greater change in the blood in the latter disease. In the case of Mayne, and still more so in that of Reily, both cases of blue cholera, partial reaction was restored by means of the croton oil and opium, the pulse was felt returning and then vanishing, until at length it was established, but the heat of scalp indicated danger within the skull, and complete reaction could not be procured by the repeated action of the stomach. When seen early in the stage of invasion, and even when the skin was slightly blue, a free stream of blood appeared to reduce the disease to the common kind where the remedies were equally efficacious as in sporadic cholera. When the pulse is felt after the skin becomes blue, and the spasms set in, it often remains, and in such cases reaction is complete. In most cases, however, no sooner do the violent spasms set in, than we feel for a pulse in vain. There

is no doubt that bleeding from a vein, when the blood will not flow, or when a patient faints, accelerates the disease, and the little pulse felt before opening the vein, is speedily lost, and the stage of collapse completely formed, and yet, in common cholera, though bleeding has generally the same effect, the pulse is brought back as if by magic by repeated doses of opium and croton oil, so that, in every point of view, we are forced to the conclusion that the blood loses its vitality in blue, epidemic cholera, while this takes place, only partially if at all, in common cholera.

In the stage of invasion, this change is commencing, and speedily involves the whole blood in the body; there are, in fact, in this stage, and in the early period of collapse, two distinct currents of blood from the vein; and in a case witnessed at Muttra in 1838, the first fluid that appeared resembled the serum of the blood, then followed the dark blood of Cholera, and lastly healthy blood, and after 3lb had been abstracted, the disease was completely checked. At this period the man complained of great weakness and would have fallen down had I not supported him. The slightest ailment, therefore, marking the stage of invasion, seems indicative of this great change in the blood, and which is completed when the skin becomes blue. In Common Cholera, the blue skin is not present, but rather a purplish hue of the skin and nails; the absence of this colour is, therefore, an index of the blood still retaining its vitality, at least in a great measure, and at once distinguishes the two kinds of Cholera, the one is a manageable disease, and the other a deadly one, when the blue skin is once fairly established. The stage of collapse is for the most part established in Common Sporadic Cholera before the patient is seen, and such has taken place in most of the cases which have occurred among the men of the 1st European Light Infantry since 1843; and yet, in not a single instance have the remedies failed in producing reaction and recovery.

It is doubtful whether the blue skin indicative of the change in the blood ever occurs in Common Cholera, but I cannot speak confidently on the subject, as I never failed to arrest the disease before that occurrence.

In blue Epidemic Cholera, then we must direct our undivided attention to its first stage, or that of Invasion, since fatal experience has amply proved that our treatment in that of Collapse is, at best, eminently doubtful, while the partial reaction forming the third Stage is speedily followed by death.

I shall for the benefit of the younger members of the profession, recapitulate the symptoms of the three Stages.

Stage of Invasion marked by any ailment, however slight, such as giddiness, headach, ringing in the ears, inability to stand, shortness of breathing, uneasiness in the præcordia, nausea, want of appetite, looseness in the bowels and general debility, externally, the countenance is anxious, and the eye directed to no particular object.

Stage of Collapse exhibits a feeble pulse or its absence altogether, a cold clammy skin, vomiting, purging of Conjee water stools, excessive thirst, spasms, sunken eyes with an areola round each, fingers shrivelled, nails and skin blue, no secretion, heat about the Scrobienlus Cordis, thirst restlessness and prostration of strength, cold tongue and expired air equally so.

During re-action, the crown of the head, or the scalp becomes hot, the breathing is affected and oppressed, the thirst continues, all the symptoms of Collapse except the permanent ones may have ceased, but the characteristics of the stage of re-action are the heat of scalp and oppressed breathing. The eyes sometimes become red,* but this is an effect of the disease and points out great congestion in the brain, when re-action is complete and the pulse returns with heat of surface, there is still heat of scalp and often severe headach, particularly in the back of the head.

* This redness of the eyes seems to indicate re-action and the restoration of the vitality of the blood in the Arteries supplying them; it is not always, therefore, a bad symptom.

CHAPTER III.

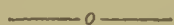
Diagnosis and Prognosis of Blue Epidemic Cholera.

Diagnosis.

When the disease appeared in England in 1831, the Medical practitioners would not at first believe in the identity of the Epidemic with the true Oriental Cholera. but at the time a Medical Officer* of the Honorable Company's service, who was then in England, on being referred to, gave a decided opinion that the two diseases were identically the same. As a reward for his services, he was created a Baronet. I had the pleasure of serving under the Gentleman alluded to on my first arrival in India, and often at the General Hospital did he point out to my particular attention the Conjee stools as marking the existence of Cholera. The disease in its common form, might be mistaken and overlooked, for there is often little or no vomiting and the bowels may not be much affected; the pulse may be felt; in short, it may be misunderstood. This can hardly occur in genuine Blue Epidemic Cholera, when in the Stage of Collapse, nor in that of invasion after one well marked case has occurred. The four permanent symptoms distinguish the disease from all others, and one of them, the *blue* skin, marks the difference between it and Common Cholera. Want of pulse, a cold clammy skin, want of all secretions, Spasms, Vomiting, purging of Conjee Stools mark Common Cholera, and more severe Spasms, and a blue skin superadded leave no doubt of the disease being the Blue Epidemic Cholera. The Conjee stools are present in Sporadic Cholera, and do not of themselves, at least in India, distinguish the Blue Epidemic Cholera from the common kind, but the blue skin and severe Spasms always mark the former, and are pathognomonic of the disease. Common Cholera may be confounded with the Collapse in fever or Dysentery, the pulse may be absent in both, and the

* The late Sir William Russell Bart,

Stomach may reject all ingesta fluid and solid, great thirst may prevail, but the Conjee stools and Spasms more or less severe point out the difference, as well as the history of the case. It is impossible to confound the Blue Epidemic Cholera with any other complaint.



Prognosis.

This is always unfavourable in the Epidemic Cholera, when the disease has reached the Stage of Collapse, recoveries from confirmed Collapse are rare, and when the symptoms are well marked, the duties of the Physician are merged into that of a spectator who can do little more than watch his patient, and keep the cold lifeless wrist in his hand watching the progress of this fearful disease. When re-action is complete which seldom happens, then there is every prospect of recovery by proper care and treatment; but when partial and confined to the brain, there is little, if any, hope of life being prolonged beyond a few hours, and if the breathing be much oppressed, a few minutes may close the scene.

Though the Prognosis is thus unfavourable in the second and third stages, there is perhaps no deadly disease in which the Prognosis is more favorable than of Cholera in the stage of invasion when the proper treatment is resorted to. As far as my own experience goes, I assert this with confidence. I have now witnessed the disease in its Epidemic form twice, namely at Muttra in 1838, and at Subathoo in 1845, and the result of the practice in the stage of invasion was equally marked in both instances. On the outbreak of Epidemic Cholera, the first cases are brought in the state of Collapse, and it is some time before the men can be led to believe in the importance of premonitory symptoms, so that daily casualties occur, and the list of deaths creeps imperceptibly up so as to become alarming. At length the men begin to see the importance of early application. Though I employed the lancet at Muttra, it was always in opening a vein, and it no doubt happened that men were lost from not opening an Artery which would have bled after the vein had ceased. The Epidemic in 1838 had not the apoplectic diathesis so well marked, perhaps as that of 1845, and the abstraction of

blood from a vein was in general sufficient in the stage of invasion for arresting the disease, at least the result appeared to prove this, as there were only about five deaths out of twenty five cases, and all the fatal ones were in the stage of Collapse before admission. There were only about one hundred men in the troop and a fourth was a large proportion to be attacked, while a fifth of the admissions was a small mortality.

The mortality at Subathoo on the men admitted from Barracks and Camp was about the same, but the whole of the men seized in Hospital, while labouring under other diseases, dying with two solitary exceptions, raised the mortality to more than a fourth. Almost every man who died was in a state of Collapse when seen except at the outset of the Epidemic, when the blood was only abstracted from a vein. I believe bleeding was resorted to by the Medical Officers at other stations, but with variable success, and was not found useful towards the close of the Epidemic. All my Assistants can testify to the success of *Arteriotomy* throughout the Epidemic at Subathoo, and they looked with certainty to a recovery when it was performed early. The Prognosis then to be formed in Blue Epidemic Cholera is entirely dependant on the stage of the disease; it is unfavourable in the two last, and highly favourable in the first or stage of invasion. When the pulse returns or keeps good, and the skin becomes or remains warm, we may look for a favourable issue in any stage, but when the pulse fails and disappears the skin becoming clammy, cold and blue with violent Spasms, we may prognosticate a fatal termination unless a free reaction takes place, but when this is partial and confined to the brain, death is certain, and the breathing becomes oppressed & the inspirations slower and slower, we may then watch for death and all earthly means are useless. I have seen, however, the inspirations reduced to 15 in a minute, and yet the patient survived for several hours.

The oppression of breathing is the sure forerunner of death whether re-action has commenced in the brain or otherwise. When recovery is about to take place in Common Cholera, the skin becomes dry and the pulse is felt, these are indicative of the return of arterial blood to the heart and the system in general, for the moisture and want of pulse are necessarily consequent on the absence of arterial

blood, the loss of temperature depends on the same cause and the warmth of the skin is a favorable symptom, though it cannot be expected to occur in Blue Cholera until the vitality of the blood is restored. The return of the pulse, warmth of the skin and tongue, as well as the expired air must all follow the restoration of the blood to its natural condition, and in complete reaction are generally simultaneous and the one or other is to be hailed as a favorable symptom. The voiding of the urine is indicative of vital blood being sent to the kidneys, and no urine can be formed or ever is formed unless this takes place, it is therefore a favorable symptom, and a few drops are sometimes voided, but rarely even in the partial re-action that generally occurs in Cholera. A desire to void it is sometimes expressed, but too often none is passed or found in the bladder on introducing the Catheter. Though not recognisable by our senses, the absence of bile and gastric juice is equally marked, in short that of every secretion and mark equally as the loss of pulse, cold, clammy skin, spasms and blue skin, the change in the blood.

It is curious to observe the struggle regarding the pulse when about to return, it may be just felt, and the next instant it ceases, then a fluttering of the radial artery is perceptible, the skin becomes warm and dry, and a feeble pulse is at length established, and which, if the disease has been arrested by art or removed by nature, continues to beat. The patient lays in collapse with his eyes half shut, but this condition approaches no more to sleep than if his eyes were wide open; the power of volition is lost in the muscles concerned in shutting the eyes as much as in other parts of the body. The eyes can be opened by an effort of the will, but this arises from the irritability of the fibre, and no great exertion being required, but in the last stage even this cannot be done, and the eye remains steadily half shut, and the organ itself insensible to light. When therefore the eye becomes fully closed, it is a most favorable symptom, indicative not only of sleep, but of the restoration of the function of the muscles. We look however in vain for closed eyes, when there is no pulse, no warmth of skin or so long as the latter is clammy and blue. The pupil in the latter stage is contracted and will not expand, the function of the iris like that of all other organs is lost, and when the pupil expands on the application of the sti-

musculi of the light, it is a favorable symptom. These minute symptoms are seldom watched, for in Cholera recovery when taking place, is rapid and no single favorable symptom present without the whole. Where the pulse never disappears but becomes fuller and softer, attended at the same time with warmth of the surface, then there is little or no danger to be apprehended, and yet here we must watch the patient, for a relapse may occur in a few hours, and we are then astounded at feeling no pulse, and the skin bedewed with a cold clammy sweat.

As regards sex, I have found in the present Epidemic that the Prognosis was more favorable in the female ; and in several complete reaction and recovery took place. Little can be done for children labouring under Cholera, and the Prognosis is generally unfavorable. It makes little difference as regards men, whether they be young or old drunkards, or of sober character, when once in the stage of Collapse, the Prognosis is equally bad, and it is often remarked that the finest and most sober men are the ones carried off. at least many of them do fall victims. A man's habits and constitution certainly modify some of the symptoms. When the individual is young, strong and muscular, there is every chance of the Spasms and other muscular actions being stronger and longer continued, whereas in old weakly people neither spasms, vomiting or purging may be observable, but the loss of pulse and cold skin are sufficient to mark the disease, when the Epidemic Cholera is raging. In weakly females, and the same applies to men, the disease may be tedious and life prolonged, when the irritability of the muscles is not speedily exhausted by Spasms. As Diarrhoea is generally a symptom in all subjects afflicted with Cholera, the muscular fibres of the intestines would appear to contain the greatest amount of irritability and capability of acting through this when that of the muscles of voluntary motion, or even those of the stomach are not excited to action, but in general the fibres of the stomach act by their irritability equally as those of the intestines. The violence of the Spasms must therefore be looked on as a sign of speedy dissolution, their absence of a slower but not less sure death, and our Prognosis is equally unfavorable in both cases where the other concomitant symptoms are present.

In Common Cholera not attended by the blue skin I was inclined to look upon the action of the stomach as an effort to remove the disease, and there is no doubt but the repeated action of this organ excited by Croton Oil and opium did restore the pulse, the warmth of the skin and produce recovery. In such cases the action must have been functional, and I believe in Blue Cholera, that the vomiting is a sure symptom of mere organic action like that of Spasms and purging, when occurring without the aid of medicines. That the action of the stomach is powerful in removing congestion there can be no doubt, and it is equally true so far as my own experience goes, that it will cure the Common Cholera where little or no change has occurred in the blood, but where the complete change has been effected, as indicated by the blue skin and violent Spasms, the action of the stomach as evinced by vomiting is incapable of producing reaction so far as I have observed in the present Epidemic. It is therefore a bad symptom depending equally as the purging, Spasms, loss of pulse, cold blue skin on the same cause, namely, the loss of vitality in the blood, and is the effect of an organic act or irritability of muscular fibre independent of vitality. On the whole the body becomes a living corpse, and life is sustained by organic and not functional action except in the brain, and when this occurs, what can be expected but death in Blue Epidemic Cholera when fully confirmed.

Though I have mentioned under the head of the stages of Cholera that any symptom, however slight, may be taken as a premonitory one, it must not be understood that the remark applies to individuals out of the sphere of the remote exciting cause. Such symptoms may arise from some functional disorder in the stomach, liver or bowels, but even here the case must be narrowly watched, and those suffering from bowel complaints should remove to a distance when Epidemic Cholera is raging, and when giddiness, ringing in the ears, or headache occurs, it is always prudent to abstract blood which, on such occasions, is dark and might have undergone the change which occurs in Cholera. When the blood flows freely and the pulse remains good, and the skin warm after the bleeding, there is little to be dreaded. All this may be called *over-caution*, but it is to be recollected, that the disease which may occur is not a common one over which

our remedial means have any control, but a deadly one, which kills in a few hours.

CHAPTER IV.

The Pathology of Blue Epidemic Cholera.

I have endeavoured, in the two former Chapters, to give the symptoms, whereby Blue Epidemic Cholera is recognised in its three stages; and also the Diagnosis and Prognosis by which the disease may be distinguished from others, and an idea formed whether we can hope for recovery or prognosticate its termination in death.

Many others have done all this before, and perhaps more minutely, but my chief object was to establish the important point, that Blue Epidemic Cholera consisted of three well marked stages, as suggested by Annesley.

Novelty in medicine is, perhaps, as rare as in other sciences. Every thing is supposed to be known regarding the Etiology and Pathology of Cholera, and any questions put regarding symptoms and even the diseased structure in this disorder are considered by many as supererogatory.

The appearances are so similar in one fatal case to those in all others, that from one dissection, we can readily learn them and guess at the same in every other fatal case of the disease.

The Epidemic Cholera of 1845 was no exception to this rule, and the appearances after death were nearly similar in every instance.

Bodies are too often examined as a matter of course or routine, but the object is to endeavour to discover the cause of death, and there was no difficulty in ascertain-

ing this ; it took place in every case from *effusion within the cavity of the skull.*

In severe fevers of the Remittent kind, death is caused by effusion of serous fluid into the ventricles of the brain. In Apoplexy the same results from the effusion of blood on the brain, or into the base of the skull. Each is a very fatal disorder. But in Cholera we have not only the effusion of serous fluid into the ventricles, but we have effusion of blood on the surface of the Dura Mater, in the substance of the brain and in the base of the skull. If therefore Remittent Fever and Apoplexy be fatal diseases which experience has found them to be, what shall we say of Blue Epidemic Cholera in which we witness the cause of death in the two existing at one and the same time ? Merely that it is a more fatal disease than either, and this is an undoubted fact. That great mortality occurs from fever at such places as Kurnaul and Sukkur, the records of the years 1841-2-3 and 4 amply prove. Still as regards remittent fever it is a curable disease, and in support of this assertion, I may just bring forward the case of Her Majesty's 3d Buffs at Kurnal in September 1841 ; not from any vain boast, but to establish my point. I was put in charge of all the admissions in this Regiment, averaging from ten to fifteen a day with remittent and bilious Remittent fever, and out of the whole number admitted during the portion of the month I had charge amounting to upwards of one hundred, not a single case proved fatal !

But look at Blue Epidemic Cholera as it existed at Subatoo from the 8th August until the middle of September, every man died in whom the permanent symptoms of Collapse were established amounting in all to 42 !

The woful contrast will show the fatal character of the one disease compared with that of the other.

What is it then, that causes this fearful mortality ? Is it because we possess no means of cure, or is the disease an incurable one ? If we admit the former position, the latter is necessarily established so far as our knowledge at present extends. What is it then that gives this fatal character to Blue Epidemic Cholera and renders it so formidable as compared with even Remittent Fever which

causes death by effusion within the skull in the same way as Cholera does? At least in so far as the serous effusion is concerned. Do not similar causes produce similar effects in Medical Science as well as others? Certainly they do, and the very same cause which produces effusion in Fever must give rise to it in Cholera, viz., Congestion in the venous system and increased action in the Arterial; when the latter is great and powerful, then blood is thrown out as witnessed in Apoplexy and Cholera, when less so, &c. serous fluid is the result as seen in Fevers.

Before proceeding further I may just state shortly that all the three great cavities of the body exhibited a highly congested state in the Epidemic Cholera of 1845. In one solitary instance out of all the bodies examined, the lungs were not congested. The parenchymatous structure of the lung in the other cases shewed complete congestion, and spots of effused blood were found in their substance in several instances, while a dark fluid volume of blood flowed out on cutting into them freely. The cavities of the heart were filled with the same dark fluid blood which was found in the skull and chest, and there was no difference in the appearance of this fluid in the right and left side of the heart. The liver, spleen, stomach, intestines were all congested and the same dark fluid blood pervaded the whole. How then, it may be observed, if the whole blood was thus a dark dead mass could life exist even for a few hours?

This is an important question and one which has engaged the attention of Physiologists and Pathologists for many years.

The vitality of the blood was supported by John Hunter, one of the most celebrated Physiologists and Anatomists that Great Britain has ever produced. But he was more, he combined with a minute knowledge of the structure and functions of the human body an originality in his researches, which is but seldom witnessed, and throwing aside all written information, theories and preconceived opinions, he boldly thought and argued for himself and was led to the important conclusion that the blood was a *vital fluid* and as such, that it could move and act independent of the vessels in which it circulates. Since his time the

celebrated Abernethy adopted his views and assigned this vitality to electricity. But though these great men and others have from time to time supported the vitality of the blood, many have objected to it, considering it below the dignity of man that a fluid moving about in his body and actually eliminated from dead animal and vegetable matters should possess life ! Those adopting the views of this importance to be attached to the blood and other fluids in the body were named "Humoral Pathologists," and the list embraced many eminent men. The vitality of the blood was at length lost sight of, and the explanation of diseases given by means of the solid tissues of the body, particularly the muscles and nerves. Though many stoutly denied the existence of life in the blood, all readily agreed to a property inherent in muscular fibre which was independent of life, since the muscles of a dead man could be put in motion by electricity or galvanism, a power acting on the nerves, not only in exciting motion of the parts to which they were distributed, but also producing secretions depending on nervous action when the particular nerve assigned for this function was divided. Leaving out of account altogether the vitality of the blood, it was considered by many that the heart of itself could circulate the Arterial blood throughout the system. Others maintained that the Arteries themselves assisted and the point is at issue even at the present day !

Haller supposed that the heart could of itself contract and circulate the blood independent of nervous influence, and experiment proved that when the brain was destroyed the heart acted. And yet, though thus apparently independent of the brain, emotions of the mind were allowed by all to have a marked and decided effect on the heart's action. Numerous experiments were made in order to prove how far vital acts were dependent on nervous influence, but in all of them the blood retained its vitality. But suppose a state of the system exists in which the blood has lost its vitality, what must ensue ? Why death ! And such does occur in persons killed by electricity or lightning, the blood is dead throughout the body. This important fact was laid hold of by John Hunter for proving the vitality of the blood. But suppose all the blood in the body has been deprived of its vitality except that supplied to the brain, what would then be likely to occur ? Why, a loss of life in all parts of the system except the

brain! Does this ever happen? Yes! in *Blue Epidemic Cholera*, the blood is dead throughout the system, *save and except in the brain!* And what is the consequence? That the human being thus situated lives for a few hours and then dies! The only difference then between a man struck dead by lightning and one in the collapse from Cholera is that in the latter the blood in the brain is alive, in the former dead throughout the system? Precisely so.

This is an important fact, and the discovery of it will explain the whole phenomena of this mysterious and fatal disease.

Before proceeding, however, to explain how the blood in the brain remains alive, let us first see how the death of the blood in other parts accounts for the symptoms in Cholera when this effect has taken place. I have said that there are four permanent symptoms in Cholera, namely, loss of pulse, cold skin, want of secretion and the blue colour of the body. These exist from first to last, they are constant. Were the heart capable of itself of circulating the blood, it might circulate dead blood, the same is true of the Arteries. But in collapse from Cholera, when the blue skin points out the loss of vitality in the blood, is the pulse felt? No. The heart cannot circulate dead blood, neither can the Arteries. Both are merely passive cavities and tubes made for the reception and passage of a vital fluid, which deprived of its vitality, renders them unfit for their functions. But though the heart cannot circulate the blood, it still beats, it is therefore independent of the vitality of the blood? No. It is not independent of this, and it can neither beat, nor circulate the blood without the existence of vital blood somewhere! We have seen by the experiments of Wilson Philip, de Gallois and others that the heart can act without the brain, and thus circulation is carried on, but had the blood lost its vitality in the heart, it could not have caused the latter to keep up the circulation. The heart then must circulate the blood by means of the vitality in the latter independent of the brain? It does, and when the vitality is gone, the beat of the Artery at the wrist is lost. And yet the heart beats to the last in Cholera long after the pulse ceases! So do the lungs keep up inspiration and expiration! The stomach acts, and so do the bowels,

all vitals acts. But does the heart circulate the blood? Do the lungs arterialize the blood? Does the stomach digest food? Or do the bowels produce their usual peristaltic motion? No! Does the liver secrete bile, or do the kidneys secrete urine? In short, does any secretion take place? No! The blood is dead and all the vital actions have ceased, except where the blood is alive!

All this is witnessed and cannot be denied.

How then do spasms, vomiting, purging take place? Merely by the innate property possessed by muscular fibre and depending on the nerves supplied to them; and as regards them all they may be absent or disappear before death has actually occurred, and their existence or non-existence has nothing to do with the vitality of the blood, for they may occur in mere congestion in Common Cholera. But the blue skin cannot occur unless the blood has lost its vitality or venous blood be circulating throughout the system, as happens in the blue disease of children, when the venous blood passes from the right to the left cavity of the heart, and hence through the Arterial System without being arterialized in the lungs.

So long therefore as living blood is supplied to the brain, so long will the heart beat, the lungs respire, volition and sensation continue, provided the brain is not injured, but when this occurs the breathing becomes oppressed, and speedily ceases while the heart is scarcely felt and the last expiration is the sure sign, that life is extinct both animal and organic.

We may therefore draw the following important conclusions:—

First. That the blood is vital.

Secondly. That its vitality is required for the circulation of the blood in the heart and arteries as well as the veins as ingeniously pointed out by Doctor G. Wallich.*

Thirdly. That though nervous action may be requir-

* Vide Med. and Surg. Jour. N. W. P. for July 1844.

ed in the vital one of secretion as proved by Wilson Philip, yet that this secretion cannot be produced without vital blood, and that the action of galvanism in restoring the digestion after the division of the Par vagum would not have produced such an effect had the blood been dead, unless it restored at the same time the vitality of the latter, and further that the gastric juice when acting on the stomach after death does so as a mere chemical agent.

Fourthly. That though the heart and lungs may act after the vitality of the blood is lost in them, yet their functions are gone, and neither does the one circulate the blood nor the other arterialize this fluid, their actions merely depend on the brain and the nervous centres, for it is probable that the vitality of the blood remains in the spinal chord and ganglia, or else that they act through their connection with the brain.

We thus see how far the vital actions depend on the vitality of the blood, a problem which has never yet been satisfactorily explained, but which the Blue Epidemic Cholera enables us to do.

I shall now proceed to explain how the blood remains alive in the brain while it is dead in all other parts of the body.

If we examine minutely into the Pathology of Cholera, we shall have reason to admire the goodness and mercy of our Great Creator who, in inflicting a disease, wherein the blood actually loses its vitality and is in consequence unfit for sustaining life, yet preserves a portion of it alive, and this portion is sent to the brain previous to the confirmed stage of collapse ! There it remains alive while all the rest is dead ; and it is by means of it that reaction takes place and which, if fully, and universally distributed throughout the system, would and does in some rare cases remove the disease. Most people are aware of this rush of arterial blood to the brain and describe it vividly by stating that there is loud ringing in their ears, a singing noise, or even a rushing of water ! While this is going on, the Pulse is felt, when it is finished collapse is established. The system is filled with dead blood and the

remaining portion of life is carried on by this portion of arterial blood, which acting on the brain sustains the action of the nerves originating in it, the breathing continues and the heart beats so long as the brain itself is unimpaired.

There is nothing of a miracle, however, in all this since cause and effect are readily traced. The subject is one which possesses the highest interest and the explanation is a matter of the utmost importance. I shall endeavour to give one, and as my views are deduced from actual observation and founded on undeniable proofs, I trust my readers will not blame me for employing so much of their time in following me through a somewhat intricate path. I had often attempted to unravel the process pursued in this mysterious disease, night after night have I revolved the subject, but still only a faint glimmering light was all I could see. Cholera! I often thought is an inexplicable disease, we neither know its nature, its cause, nor its cure. Every thing has been tried in vain! There lies the cold blue patient and no efforts of ours can restore his pulse nor warm his death cold skin. Still he is alive though no pulse exists, no secretions are effected, the skin is cold and covered with a clammy sweat, there is the blue skin the index of the death of the blood! But still he lives a living corpse! What supports this life? The irritability of the muscles has been exhausted by fearful spasms, the stomach has ceased to act, the congee stools flow as from a dead tube! Still he speaks, is sensible of pain, exercises his will and makes no complaint! Mysterious state and yet there must be life somewhere! It is evidently not in the muscular fibres, nor in the secretions, digestion, or what are called the vital actions. It must be in the brain. Let us examine this brain. This important organ has been found to consist of two distinct structures. The gray, cortical or cineritious portion has been discovered to consist of a vast number of arterial capillaries embedded in albumen without the existence of accompanying veins as in other parts of the body. The white medullary portion is a collection of innumerable nervous tubes. The gray matter is everywhere seen embracing the white, and in the cerebellum the radiated appearance of the two has procured for it the very appropriate term of "*Arbor Vitæ*." Doctor

Stark has beautifully described this structure in his admirable paper on the nervous centres* and he further discovered that these nervous tubes of the white matter are, like other nerves, filled with animal oil. Nay, more, he has shewn that vital action depends on the influence which these two structures mutually exert on each other.

Now, in Cholera, the nervous energy is by some cause depressed or according to Stark the oil in the nervous tubes of the white matter of the brain is expended or diminished. Hence it follows that they may be rendered more compressible, or in other words reduced to a smaller size as regards their diameter, and in consequence be capable of allowing the capillary arteries to become more distended with blood. The heart in Cholera therefore sends an increased supply through the vertebral arteries, giving rise to the ringing or singing so well marked in the disease, but the nervous depression which exists though, thus allowing a large quantity of arterial blood to the brain, has the effect of causing congestion in the veins and their blood becoming at the same time dead, the arterial blood thus delivered to the brain is prevented from escaping from the veins which dip down through the substance of it being congested and unable to receive the blood from the arterial capillaries; and there it remains the *only vital blood* in the system! In this manner, the supply of living blood is sent to the brain, and that it is so is amply proved by dissection, for we find in all cases of Blue Cholera that on slicing the brain *numerous drops of this vital blood* are seen in its substance, and contrasting strongly with the blood in all the other cavities and organs of the body. Many are inclined to disregard dissections in Cholera, and maintain that every thing is known regarding appearances after death. This may be true, but when we observe the *same* appearance in every case, we may rest assured that the same cause acts in producing it, and to witness in every case, *bright arterial blood* in the brain while all the rest of the blood is the black Cholera blood, must excite our desire to account for such a wonderful contrast, at least it did mine, tho' I must confess I could only for a long time look on and wonder without being able to account for it. We have divided

* Vide Ed. Medical and Surgical Journal for January, 1845, to be found in the Medical and Literary Journal for April last,

the disease into three stages ; now it is in the stage of invasion, that this arterial stream of blood is carried to the brain, and immediately this takes place, the stage of collapse is formed, the blood is dead, the pulse disappears, spasms set in and the blue skin is established.

Here, then, we have a human frame with living blood in no organ except the brain ! In some cases reaction is hardly marked, though in general there is some heat of scalp. In others after some hours the heat extends over the scalp. The breathing becomes oppressed, the inspirations slower and slower, and the patient speedily breathes his last. This is the last or stage of reaction.

The process by which this re-action is set up is by means of the living blood in the arterial capillaries or gray substance of the brain acting on the white or nervous portion, the functions of which and the nerves depending on it are speedily destroyed ; if this re-action could be modified or distributed recovery would happen. Accordingly we find in Common Cholera, that this re-action in the course of a few seconds is universal from the crown of the head to the tips of the fingers. This I have frequently observed, when by repeated doses of Croton Oil and Opium, a universal warmth and perspiration have spread over the whole of a system, which but a few moments previously was a cold clammy mass ! In the worst cases of even Blue Cholera we find in some rare instances that general re-action takes place, but in a vast majority I might nearly say the whole, this partial re-action in the brain is the sure harbinger of death. Further in some cases the repeated application of leeches has moderated this re-action, so that life has been extended to 24 hours after the stage of collapse had been fairly established. This is a rare occurrence, and the position holds true that the re-action or third Stage of Cholera is speedily terminated in death. As was proved by numerous dissections during the late Epidemic and in every instance where they were performed by myself and my intelligent friend and Assistant Mr. Hinton, it was found that where re-action had been well marked by the heat of scalp, the blood universally effused on the Dura Mater was of lighter colour, shewing itself on the membrane in drops which appeared as if oozing out from its vessels ; while, in those cases where

little or no reaction occurred, the blood, thus, effused, was the common, *dark blood* of Cholera differing in no respect from that found in the heart, and other cavities of the body. In either case, however, the drops in the substance of the brain were uniformly of a *bright arterial hue*. These remarks prove beyond a shadow of doubt, that the re-action had in the one case reached the vessels of the *Dura Mater*, and in the other that the blood in them had never regained its vitality. The same remark applies to the vessels of the *Pia Mater*, and the arteries in it where re-action had taken place were seen red amidst the congested veins, while, in those cases, where, there had been little or no re-action, the whole of its veins, and arteries presented the same blue, dead mass of vessels. The progress of Cholera is thus satisfactorily traced from its commencement to its fatal termination, and that by actual observation which no authority can impugn. It is easy to form theories and hypotheses, but the only school for learning them is at the bed side of the patient and in the dead house. These have been our guides, and I humbly conceive, that a subject has been thus made plain and simple which has hitherto caused great discussion and a variety of opinions.

I do not maintain with certainty what I cannot prove by observation, and that is, the action whereby the blood is sent to the brain in Cholera, since it is impossible for us to ascertain in the living subject the fact of the white matter of the brain contracting and thereby allowing the increased flow of blood; but the fact of bright living spots of blood being found in the brain in all cases appears to prove that *here and here alone* the vitality of the blood remains. It may be asked if this blood remains alive, how does it not communicate heat to the scalp in the state of perfect collapse? In order that this heat may be felt it appears necessary that the life should be restored to the blood in the vessels of the *Dura* and *Pia Mater*.

Since the structure of the spinal marrow and ganglia is according to Stark of a similar kind to that of the brain, and as the first is supplied with blood from the vertebral arteries before they unite to form the Basilar, it is probable that the vitality of the blood exists in the arterial capillaries of the chord, for the parts supplied by the nerves from it retain their sensation, though this might occur from the connection of the latter with the brain itself.

Why, it may be asked, does the blood remain in the arterial capillaries of the brain more than in any others ? This is readily explained by the peculiar structure of the gray matter which, as already observed, consists of arteries *entirely* without any accompanying veins.

In Asphyxia from whatever cause arising the life must exist in some part. The lungs cease to act, so does the heart, all sensation and motion are lost, the person is to all appearance dead, but the blood is still alive, and if by artificial respiration the breathing be restored, the pulse returns. Asphyxia is therefore a state approaching closely to death but not so close as Cholera. The difference of the two may be illustrated by supposing a candle to be partially extinguished. at first the wick remains red ; this may be termed Asphyxia, and if Oxygen be applied, the flame may be restored, but if a certain time elapse and the wick becomes entirely black, then death has taken place and nothing can restore it unless we apply flame or new life to it. In Cholera the wick becomes blacker, but there is a portion of flame still remaining at the top barely visible, it flickers for a time and then ceases, life is extinct. But we sometimes see even in an expiring taper the spark which had almost disappeared at the top brighten up and in time renew the flame ; oftener, however the portion of wick drops and with it the flickering light. Thus it is in re-action. The small flickering is represented by the living blood in the brain and the nervous portion by the wick ; if the latter be entirely consumed, the flame is totally extinguished ; death takes place, but if this flame diffuse itself downwards, the whole light is restored, life returns. Flame is the emblem of life ! It requires to be fed, and if the oil, wax or other combustible substance be withdrawn or exhausted, then it cannot continue. Here the material resembles the chyle furnished by digestion. But without Oxygen no flame can occur. At this point of comparison the resemblance becomes complete between flame and life, for unless the chyle, when mixed with the venous blood, be exposed to the action of air and acquire Oxygen, it is incapable of supporting life. In the lungs this blood imbibes Oxygen and gives out carbonic acid, so does flame ; but if this Oxygen be diminished so will the brightness of the flame suffer a corresponding change, and if the Oxygen be altogether withheld, the flame ceases,

and so does life under similar circumstances ! It may be therefore asked, will not the loss of Oxygen in the atmosphere account for Cholera ? No. Life is readily extinguished if Carbonic Acid Gas or any of the noxious gases be inhaled instead of Oxygen, but this is by arresting the action of the lungs or from Asphyxia ; the life of the blood is not immediately destroyed, and when this occurs, as it may do rapidly, the whole powers of life cease, there is no life any where. In Cholera the lungs act and the heart beats, but the former act on dead blood and no living fluid supports the latter ; the action of both after the pulse has ceased and the blood lost its vitality, depends on the living portion of blood in the brain. The cause which produces Cholera must act through the nervous system, and its effect is similar to that of dipping the wick of a taper in water all except the very point, which will alone burn when flame is applied. The flame of a taper then represents the vitality of the blood and the wick the nervous system or the brain, while the inflammable substance supplying matter is the chyle, and the process by which this is extracted from animal or vegetable substances has its representative in the stomach. The more inflammable the substance is, the brighter will the light be ; so the richer and more nourishing the food is, so will be the degree of energy in life, provided the wick or nerves are of the proper kind and in the healthy condition ; these circumstances depend on original constitution, and though by constant snuffing and trimming we may keep the taper lighted, yet if the materials of the wick and taper be not of the proper kind, the flame is never bright, so if the nerves are originally weak and the digestion bad, the energy of life is diminished, health is imperfect.

But though we have the oil and taper ready, no flame will follow unless a light be applied ! So in animal life a light or vital principle is required, and in animals this principle is lighted up in the embryo or ovum. The ovarium is like a collection of small tapers, which of themselves could never burn, but if the vitality or flame is communicated by the spermatic fluid eliminated from the vital fluid of the blood, the ovum lives, grows and is at length evolved bearing the likeness of its parents.

This living principle pervades all nature. In the flower the pollen shed on the stigma gives life to the ova or to several ovula which are at length formed into seed, and being committed to earth there receive the necessary supply for preserving life in the same way as the young of an animal is placed on earth and there receives nourishment and air. Each grows and attains maturity. In animals a new progeny may arise at this period according to the passion or desire. In vegetables, it is not, of course, regulated by these, for the plant throws out blossoms which expand and become flowers with all the organs of reproduction, and seeds are, eventually, formed which fall to the earth and produce plants of a similar kind.

Man, animals, and every living thing were created by the Almighty, and He it was who endowed the first of each with the vital power. A being capable of doing this must also have the power of extinguishing it, and every living thing on the earth is in his power and under his guidance, no life is lost without his knowledge, and though natural causes are employed by him for extinguishing life and keeping up generation after generation, yet he gives the fiat, and without his will no life is lost. As one taper may light many and yet retain its own flame, so man and animals as well as vegetables may produce offsprings and seeds without injuring their own vitality, though as regards vegetables many of them only produce flowers and seeds twice or thrice, and the princes of the forest may live for centuries. The same holds true as regards animals, some die after a few hours' existence as many insects, others after a few years, while the Elephant and some species of birds attain a very old age. To man in the earlier ages of the world a long period of life was allowed, but this since the Flood has been limited, and three score and ten years are the period given as the limit, though some attain the age of one hundred and upwards, but the great majority die before the age of seventy, and few die of purely old age, most are removed from the earth by disease; these are the weapons employed by our Creator for extinguishing life, but thee are intended also for a much higher end; namely to keep us in mind that we are frail mortals and that this earth is only a place of temporary sojourn. We are told in Seipture, that our Creator willeth not the death of his creatures, but rather that all should repent and live. He has therefore mercifully enabled us to remove variou

diseases, and the afflicted man is once more restored to life in order that the warning may have a salutary effect on him. Some maladies are slight and recovery soon takes place, others more deadly terminate often in death, but all must die, and at times a fearful disease rages in the form of Plague, Fever or Cholera, which puts at defiance human aid, and though some recover, yet where the fiat has gone forth our means are vain and we often find in two cases exactly resembling each other, one shall die in spite of our means and the other recover. We can account for this in many instances, for though we are under his will and guidance, he works by natural means. We may recover from several attacks of disease, but in the end all must leave the earth. Physicians have endeavoured to discover the remote and essential causes of fatal diseases, and much has been done as regards many, but still there is much to be known regarding such diseases as Fevers, Cholera, Plague, Apoplexy, which sweep off thousands of the human race. The most mysterious perhaps of all is Cholera, and the ingenuity of man has hitherto failed in curing it when fully established in its Blue Epidemic form.

CHAPTER, V.

The causes of Blue Epidemic Cholera.

The causes of Cholera like those of all other diseases are divided into two sets, namely, the Essential or Proximate and the Remote. The latter comprehend the predisposing and exciting.

Both sets of causes must come into operation before any disease can take place, and were the predisposing causes of Cholera present without the remote exciting one, the disease would not occur, neither could the existence of the latter produce Cholera without the occurrence of a predisposing cause. Were it otherwise, we should see every disorder of the system followed by Cholera and every individual seized with it when it appears in the

Epidemic form. The whole art of Medicine then consists in removing the essential cause and avoiding the remote ones.

If we endeavour to combat symptoms and not the essential cause, we shall fail. and our practice becomes empirical, the only safe and successful means must be directed to the latter object.

SECTION I.

Predisposing causes of Blue Epidemic Cholera.

The first object in the treatment of Epidemic Cholera is to prevent the predisposing causes from coming into action.

I have stated in giving an account of the symptoms of the first, or stage or invasion, that any ailment, however trifling, may be safely looked upon as indicative of the disease, so as regards predisposing causes, any thing which disturbs the system, particularly the vital functions of digestion and the action of the bowels is the sure and fertile source of a predisposing cause.

Among the soldiers who were seized with the malady, there was hardly any of them who could not assign some cause or other connected with the stomach or bowels as that which had brought on the disease.

Hence, no doubt, the great benefit of emptying out these viscera as early as possible, not only in Cholera, either Sporadic or Epidemic, but also in febrile disorders, and the headach present in the latter often disappears after free vomiting. Such substances as pieces of meat, bread, fruit, vegetables were generally brought up, when the Croton Oil and Opium, or the former with Tincture of Henbane were administered; and patients for the most part complained that there was a weight in the region of the stomach,

pointing to the exact spot; and on the removal of this they placed the first importance. On asking them how they felt, the answer frequently was "Oh! sir, if I could only get rid of this weight I should be all right." That the disturbance in the digestive organs acts thus a primary part in Cholera, is amply proved by the immunity which attends Officers as compared with the common soldiers; for we seldom see in Epidemic Cholera that any of the former are attacked, though their duties lead them to the very locality of the disease, and as regards Subathoo, several of the Officers' Bungalows were close to the Barracks, and no doubt within the range of the exciting cause, at one time or another.

The importance of the stomach is acknowledged by all. It is the viscus in which the first process, by which the vital fluid of the blood is supplied with fresh nutriment, takes place, and to secure the healthy condition of the latter the digestion must be carried on.

It has been supposed by some of our ablest Indian Physicians, that the thin congee stools of Cholera are actually the chyme or chyle which, instead of entering the Lacteals and thus reaching the heart and lungs, passes off by stool. The supposition appears to be well founded, for we have only to imagine the chymous matter mixed with the large quantity of water usually drank in Cholera to account for the congee stools which partake in no way of the nature of fæces.

Is there any thing in the constitution, or mode of living of the Natives of India which gives a predisposition to Cholera? The Hindoos live on vegetable matters, and in the Province of Bengal rice is universally employed. It is well known that Cholera is a common complaint in the Lower Provinces, and so convinced was the late Dr. Robert Tytler of the pernicious nature of rice as a common article of diet, that he denounced it as the cause of Cholera, and actually proved to his own satisfaction, at least, that by feeding animals on it exclusively, he could produce the disease!

The tone of the nervous system is so intimately connected with Cholera, that it is not to be wondered at, if poor, ill-fed individuals, either Native or European, should

be liable to Epidemic Cholera, and we accordingly see that European Officers who live on animal food, and use a portion of Wine, Beer and even Brandy, seldom fall victims to Cholera, or rather they are seldom attacked. When an Officer happens to be travelling within the range of Cholera, and his nervous system depressed by fatigue, want of sleep and nourishing food, as well as the usual stimulus of wine, he is often seized with Cholera. This fact is well known in India, and many instances have occurred of dak travellers dying of this disease in the course of their journey. People suppose that the use of wine or spirit acts in assisting digestion, but their action is on the nervous system, and so far as that on the stomach is concerned, it would be more advisable as recommended by Abernethy to abstain from its use until some time after the completion of the digestion. The nervous system is apparently weakened, when digestion is completed, and it is at this period, that we observe generally the invasion of Cholera early in the morning with those who take their last meal at night.

Any cause, therefore, which tends to disturb the stomach during Epidemic Cholera, may act as a predisposing one, for it is the first link in the chain of vital actions, and is itself speedily affected in the disease.

The action of the bowels is equally important and a vital one. Any thing which can at all disturb them must act as a predisposing cause in Epidemic Cholera, and the fatal consequences of taking opening medicines during the prevalence of Cholera are well known and justly dreaded. Even Castor Oil, though stated by a high authority* to be the only harmless purgative, must be used with discretion. Many fatal cases of Cholera during the present and former Epidemics could be traced to a loose state of the bowels brought on by laxative or purgative medicines. Whether the bowels be relaxed by disease, or medicines the nervous system is weakened, and this circumstance is sure to give a predisposition to Cholera; hence the importance of checking it immediately by opium or even Jeremie's drops, which contain that

* The late Dr. Twining.

drug in solution. The profession is too apt to sneer at the employment of such remedies, as well as Oil of Peppermint in the form of Essence or any other aromatic substance, but there is not a shadow of a doubt that any thing which tends to improve the tone of the stomach and bowels has a corresponding effect on that of the nervous system. Whereas a draught of cold water, the use of vegetables, fruit, unwholesome food, bad bread with purgative or laxative medicines by disturbing the tone of the stomach and bowels and consequently that of the nervous system, must all act as predisposing causes of Cholera. In ordinary circumstances such things may be used with impunity ; it is only when the great remote exciting cause of Cholera prevails and exhausts the nervous energy that a drain on the nervous system is most felt : purgatives and laxatives are given daily ; Diarrhœas and Dysenteries continue for weeks and months, food of all kinds, fruit, raw and ripe, are used without being necessarily followed by Cholera, there must be in short two sets of causes, a predisposing and exciting, and the one will not act without the other. On this hinges the whole secret of some individuals being attacked and other remaining free, when living under the same roof and equally exposed to the exciting cause.

The same remark is applicable to all diseases and readily accounts for many Medical men denying the contagious nature of even Plague. Their nervous systems are in full vigour, and they do not dread the disease, there is no predisposing cause, and the exciting one cannot act, but the nearest individual may become the victim from being predisposed. There is no more marked predisposing cause of Cholera, and the same remark holds true of other diseases than the dread of being seized with it. The fear thus evinced is not the real cause, it is the effect of constitutional weakness of the nervous system, or where the latter has been induced.

It is often remarked that medical men escape in a wonderful manner from Cholera, and this is only to be explained by the excitement caused by their arduous and important duties preserving the tone of the nervous system. Were it not for this, a medical man who has watched for days and nights is of all others the most liable to any

Epidemic disease, and accordingly we find that when this excitement subsides as the disease disappears, or on the loss of a patient regarding whom he has evinced the greatest anxiety, the death of a Medical Officer is no uncommon occurrence, and their being seized with premonitory symptoms still more frequent. I can speak feelingly on the latter subject. For, in both the Epidemic Cholera at Muttra in 1838, and that at Subathoo in 1845, I felt no indisposition, though watching night and day for weeks together, until the excitement and the Epidemic had subsided, when on both occasions I had the true Conjee Diarrhœa, and on the latter occasion, I experienced the ringing in the ears and prostration of strength. The symptoms were, however, speedily removed by large doses of the hill Opium which checked the Diarrhœa. In Epidemic Cholera, the duties of a Medical Officer are of a most arduous nature, and it is not to be wondered at if they often suffer.

Other passions than dread or fear of the disease have great influence as predisposing causes, particularly grief. Numerous instances have occurred of men after witnessing the funerals of their comrades, being almost immediately seized with Cholera, and a very remarkable instance happened at Muttra in 1838 of a fine young man falling a victim to Cholera in a few hours after visiting the Churchyard for the purpose of seeing the grave of a comrade. He was in the state of collapse at 4 p. m., and died about 9 o'clock the same evening; he was not of a nervous temperament, and apparently in the enjoyment of perfect health previous to his visit to the Churchyard.

Though it be of the utmost importance to preserve the tone of the nervous system, yet the means adopted for this, if of a stimulating nature and liable to be followed by depression, become of themselves predisposing causes. Of this kind is the abuse of spirits which is a common occurrence at the outbreak of Epidemic Cholera. The men take an additional dram or two as the best means for keeping off the Cholera, and too often indulge, until great excitement and even drunkenness are produced, and after sleeping off the effects of these, the individual falls an easy prey to the Epidemic. It is difficult to prevent European soldiers from drinking hard, and they often become reckless, par-

ticularly when they witness their comrades who may be of sober habits falling victims to Cholera, never thinking that there are numerous other predisposing causes of this disease, until the truth is forced on them by fatal experience. In every Regiment of European soldiers in India, there are certain men who have given up the use of spirits and joined the temperance Society. Some of these, in Epidemic Cholera, break through the rules, and take their dram which they had not probably done for years, and the consequence is, that their system is thereby deranged, and they become liable to be afflicted by the prevailing Epidemic. Any unusual change in food or drink may be the predisposing cause of the disease. Excess in either, as well as any other excesses, predispose the individual guilty of them to Cholera, while moderation and preserving regular habits tend to preserve health; in a Regiment of European Soldiers, there is hardly a man afflicted with Cholera but can trace the disease to some cause or other, making no distinction, however, between predisposing and exciting causes, and in consequence they are astonished that articles used with impunity and intemperate habits often indulged in can give rise to Cholera! This partial view of the causes of Cholera leads Soldiers to neglect paying the necessary attention to their food and habits, but the truth should be enforced on them, and the distinction pointed out between the effects which *may* follow and those which *must* ensue if they disregard the warning. It is thought that the prevalence of the East wind has something to do in producing Cholera. Many people feel unwell during the long continuance of an Easterly wind, and in this condition, they are more liable to the influence of any prevailing Epidemic.

In Cholera, as well as other diseases, we must carefully distinguish between the two sets of causes, and never forget, that there can be but one essential cause, and one exciting for the same disease, while the predisposing ones may be numerous.

When one essential cause appears capable of producing two diseases by its being either increased or modified, the one is merely a variety of the other; such is the case with intermittent and remittent Fever. This was the view of the case adopted by Cullen and other eminent

Physiologists, who allowed that the same remote exciting cause, namely, Marsh Miasma or Malaria, gave rise to the intermittent type of Fever, including the simple intermittent, remittent and bilious remittent. The Great Sydenham regarded Dysentery as fever of the bowels, and many have supposed, that true, Oriental, idiopathic Dysentery may arise from Miasma, yet from not allowing the same essential cause, they cannot reconcile its character to that of fever.

In Common Cholera, does the increase of the cause lead to the Epidemic Blue kind in the same way as we allow the increase of that of intermittent fever to produce the remittent? In other words, is Blue Cholera and Common Cholera varieties of the same disease? In the case of intermittent and remittent fevers, we see the latter passing into the former under treatment, but has any one observed Blue Cholera becoming Common Cholera? We see during the prevalence of fever, at such places as Kurnaul, that in August and September, they are mostly remittent and of a fatal character, while towards the end of September, and throughout October, the fever becomes pure intermittent. The same great exciting cause appears to set up both fevers, and the difference in the type or severity is probably to be attributed to the increase of temperature which prevails in August. But in Epidemic Cholera with a blue skin, we do not find that it is followed by the common kind, whatever the change of temperature may be, but we very commonly find it succeeded by a violent type of fever resembling the reaction of Cholera without the Stage of Collapse, and depending, apparently, on an exactly opposite state of the atmosphere. Were the two kinds of Cholera merely varieties of the same disease, like intermittent and remittent Fever, then we should expect the milder Cholera as the other ceased, but such is not the case; and as regards the Epidemic of 1845 as it occurred at Subathoo, the last case in the Stage of Collapse was just as well marked as the first, and the treatment efficacious in Common Cholera equally ineffectual, as it had been in the first. Here, then, we have two diseases named Cholera supposed by many to be mere varieties, and differing only in severity, never passing from one to the other, yet resembling each other in every symptom, save one; the one curable, and the other an

incurable disorder in the great majority of cases. This is very puzzling, and no wonder that the subject has caused so much discussion.

My own opinion is, that the essential cause of remittent fever, which I look upon as congestion, may be so aggravated or increased as to produce Common Cholera, and we actually see a patient labouring under fever seized with all the symptoms of Cholera; nay, further, we find that in Common or Sporadic Cholera, the very means employed in remittent fever with success succeed in curing it.

I have already discussed this important point, but there is much to be said, and though a knotty one, the subject appears capable of being cleared up.

How does it happen, if Epidemic Blue Cholera be the same as the sporadic in an aggravated degree, that the latter occurs at all seasons, and every year, whereas the former is witnessed only at intervals of years? We see Common Cholera, Fever and Dysentery prevailing at one and the same time, but this is not witnessed in the Epidemic Blue Cholera, such as it appeared at Subathoo in 1845. The Epidemic *monopolised* the whole, and though the admission might be called Diarrhoea or fever, a few hours were sufficient to dispel the fond hopes of having a manageable disorder to deal with, and the stage of Collapse was established. As already repeatedly stated, every ailment during the Epidemic Cholera, provided, the individuals are within the range of the great remote exciting cause, is the forerunner of the disease, and if this be not attended to, and our practice founded on it, we shall have to deplore our want of success, when, the disease has reached a stage, where any one can tell its nature, and the Medical man possesses no advantage over the common soldier so far as the cure is concerned. Medicine as regards Collapse in Cholera is despised, and its votaries sneered at, abused and even murdered. That they deserve the latter punishment, no reasonable man will affirm, but surely they are to blame if they do not exert themselves in finding some early symptom that may direct them, and when we find that this is a matter of the easiest accomplishment in Epidemic Cholera, medicine and medical men have it in their power to raise the

character of both in arresting a disease which, if allowed to advance, is beyond the reach of both. But neither medical men, nor the public can be brought to believe, that a little giddiness, noise or ringing in the ears, oppression about the Præcordia slight Diarrhœa, in short, any slight ailment can be the forerunner of such a terrible disease, and yet they are as certainly so, as if we had the cold, clammy, pulseless, blue skin in our hand. More will be said on this subject when treating of the means of cure.

As regards predisposing causes, it may be observed, that every one concerned in the production of fever may be equally applicable to Cholera, though many of those predisposing to the latter may not be sufficient to induce fever, if the individual be even exposed to the remote exciting cause of the latter. It is difficult, however, to say with certainty, that such is actually the case, for we find when fever prevails, as it did in 1841-2, and 3 at Kurnaul, that nearly every man in the Regiment suffered, while Epidemic Cholera seldom attacks more than a fourth. This apparent difference, however, only proves what I have advanced, it does not prove that every predisposing cause of Cholera is capable of acting as such in fever, but only that the remote exciting cause of the latter has a wider range than the former, though this be of a more deadly nature and swift as the lightning of Heaven ! The man who has weakened his nervous system by any excess in eating or drinking, night watching, fear, sorrow or any of the numerous predisposing causes of Cholera may escape intermittent or remittent fever, but he will most assuredly not escape Cholera if he come within its range, and even fever will most probably assail him in the end. With respect to the excitement on the part of Medical Officers in times when fevers prevail, it appears to confer an immunity equally as in Cholera, and instances might be brought forward to prove this as connected with Kurnaul. It must be confessed, that much of this, however, depends on the state of mind of medical men, and the impression which the existing sickness may have on the Medical Officer ; some are annoyed, vexed and discouraged at losing men in Cholera and fever ; the consequence is, that their nervous system is disturbed, and their own healths suffer ; others take the matter in a less serious manner, perform their duties cheerfully, and to the best of their ability, and thus preserve health. I have no wish to boast

of my own individual exertions, but to show that hard duty even in the sickliest seasons is not liable to induce sickness, I may just state that in 1841, I had, in the month of September, medical charge of all the admissions in H. M's. Buffs at Kurnaul, averaging from 10 to 15 daily with the prevailing fever; the duties of the Horse Artillery, those of the 19th Regiment Native Infantry (until relieved by my worthy and esteemed friend J. Thomson, Esq. now Superintending Surgeon), the 3d Light Cavalry, the Division Staff and the Paneput Jail. I left home at day break, and often did not reach it until eleven o'clock at night, being thus for 18 hours engaged with my patients in and out of hospital, and yet I never enjoyed better health. During the Epidemic Cholera of 1845, only one medical officer died, the late Surgeon Magrath, who fell a victim to the disease at Ferozepore. Dr. Graydon, of H. M's. 50th, suffered severely from liver complaint, but a residence for a short time at Subathoo restored him to health.* One of my Assistants was obliged to report sick soon after the Cholera appeared at Subathoo after watching for some nights. It will be readily allowed that the duties of a medical man during Epidemic Cholera are of a most arduous, disheartening kind when his patients are brought to him in the state of Collapse. The seal of death is already upon them, and the blue skin points out the loss of vitality in the blood.

As the avoiding of the predisposing of causes is the important point in preventing the disease, it may be useful to bring them forward in a condensed form.

Every thing that can, in any way, depress the nervous system must be avoided, such as :—

1. All fluid and solid ingesta which disturb the function of digestion, such as raw vegetables, unripe fruit, unmasticated pieces of meat, bad bread, cold water when the body is heated, adherence to vegetable diet without spices, carminatives and the like.

* This Medical Officer was in charge of Her Majesty's 31st Regiment during the prevalence of the Epidemic at Umballa: he was killed at the battle of Moodkee, on the 18th December, 1845, most deservedly regretted by all.

2. Purgatives and laxatives producing a loose state of the bowels.

3. Indulgence in eating and drinking, excesses of any kind, depressing passions of the mind, as fear, grief and unusual anxiety.

4. Sudden alteration in the habit and mode of living, or the passing from one extreme to the other.

5. Suppressed cuticular discharge, suppression of any usual flux.

6. Irritation caused by any state of the system.

7. Exposure to the solar rays, damp, night air and the like.

SECTION II.

The Remote exciting cause of Blue Epidemic Cholera.

I had advanced the opinion that miasma might not only cause fevers, but also Cholera, Dysentery and even Rheumatism ; and from witnessing all four diseases occurring at one and the same time, and still more from observing fever passing into Dysentery and the latter into the former according to the state of the atmosphere, the conclusion appeared correct. Besides, the great Sydenham himself styles Dysentery a fever of the bowels. This opinion remains unshaken, but there is a Cholera marked by a blue skin which depends apparently on a change in the atmosphere, totally independent of miasma, and which visits tracts of country where the latter does not exist. Caloric or heat may cause fever, and cold and damp give rise to Dysentery, but neither the one nor the other can account for Epidemic Cholera, since we find it raging at all seasons independent alike of heat, cold or damp.

The atmosphere possesses another ingredient besides its gases, namely, Electricity. All bodies on the earth, and the earth itself, are likewise endowed with it. When the just quantity is present, then no change is observed, but if this equilibrium be disturbed in the atmosphere and it becomes overcharged, or positively electrified, then its discharge occurs by thunder and lightning, and the earth which had been deficient and all living nature become revived. The elasticity of spirits is visible in man, and all nature smiles after a thunder storm or when a clear blue sky succeeds a cloudy, close and oppressive atmosphere.

There is little doubt that this Agent acts through the medium of the nervous system, particularly the great nervous centre of the brain, and I may adduce a case which bears strongly on the point. A man was killed by lightning at Kurnaul, and on examining his body, there was no mark of injury, and the only thing observable was a small circumscribed spot on the crown of the head which was *hot* and *moist*, as if boiling water had been applied, the effect no doubt of the mortal shock conveyed to the brain and causing instantaneous death.

It is well known that an Electric Jar can be readily charged from a person standing on an insulated stool, and that friction produces the electric spark from a cat's back, and the crackling noise from a silken handkerchief.

It is then agreed, that Electricity is a constituent of the world we inhabit, and that man possesses his share, nay, further it is probable that nervous action depends on its influence without denying that the nerves are tubes and filled with animal oil, as stated by Doctor Stark. The power of Electricity on the nerves is undoubted, they are stimulated by it whether they be the nerves of voluntary or involuntary action. As the human frame possesses the highest share of nervous energy, and the largest volume of brain, it is not to be wondered at that Electrical changes should affect it in a marked degree, or that either an increase or diminution in the Electricity possessed by it should be followed by well marked disease.

It is well known, that the remote exciting cause of

Cholera is attended, and preceded, by a peculiar state of the atmosphere, and the remark is often made that Cholera is likely to occur when no rain has fallen for a long interval, and the weather is close and oppressive. This condition indicates a positive state of the atmosphere as regards Electricity, and a negative condition of the Earth and its inhabitants. People feel languid, and many unwell, but still there is no actual disease, or Epidemic. If under these circumstances any cause extracting still more electricity from our bodies should exist, we can easily see that some terrible disease must ensue. Such occurs in Epidemic Cholera. A stratum of air near the Earth's surface may be negatively electrified, that is deficient in its due quantity, and passing along the earth abstracts Electricity from the human race who come within its influence, provided the individuals be predisposed, for it is well known, that many escape, though living under the same roof with those affected, and even a little elevation will serve to remove individuals from the Epidemic.

This, then, appears to be the great remote exciting cause of Blue Epidemic Cholera.

The nervous system already depressed by some predisposing cause is still further depressed by the abstraction of Electricity and the heart and sanguiferous system become in their turn involved.

I am inclined to believe with Abernethy, that the Electric fluid is the vital property of the blood, or that if the latter does not reside in it, it is required to enable the nervous system to impart it to the blood. When, therefore, this power is withdrawn from one or both, the phenomena of Cholera is produced. The energy of the nervous system is completely destroyed, the blood loses its vitality and animal and organic life is speedily extinguished. It is no new theory that I here advance, most Physiologists who have turned their attention to the subject have supposed that the remote exciting cause was connected with the subject of Electricity and the well known influence of the latter on the nervous system points it out, at once, as the great cause which is brought at times into action. That the disease should be prevalent in India is readily accounted for from the rapid accumulation of Electricity in the atmosphere, and portions of it near the Earth be-

ing negatively electrified. Were thunder storms of frequent occurrence, then the Equilibrium would be speedily restored or even falls of rain have a similar effect, but when neither happen or are not well marked, Cholera may and does often prevail in an Epidemic form. This negatively electrified stratum may traverse continents, and even cross seas, if not generated in the cold and temperate regions of the Earth. It may ascend the mountains and again descend to the plains. This view accords with what has occurred during the Epidemic of 1845.

Many will say, and have said, that Cholera is a visitation of Providence, and no doubt it is, but *he* works by natural means, though the latter are often hid from our limited search.

Nothing, in fact, can give us a more lofty idea of The Creator than thus witnessing the fearful means employed for cutting us off from the Earth. Here, with the lightning of heaven, he strikes man who in a few hours is numbered with the dead. The very life of the blood is taken away, and the fiat is issued for death! Other diseases are inflicted for our good, and as a means of recalling us to the recollection of our Great End. We are thus chastised for our sins, and brought to a proper sense of them. But with Blue Epidemic Cholera, the Almighty brings man to his original dust, and the period of his probation is, at once, cut short. If he has disobeyed former warnings, no other remains for him. He is cut off from all hope and must leave the Earth which he had trod a few hours before in the full enjoyment of life. All mortal aid is vain when he lays tormented with spasms, his pulse gone, every secretion stopped, and the Blue skin, the index of the loss of vitality in the blood, are present.

It may be here said that all this is religious cant, and that severe fevers are equally fatal, nay more, that we may yet discover a cure for even Blue Spasmodic Cholera. The latter assertion may be true, but considering that the greatest attention has been paid to the subject, by the first Physicians in the old and new world, and with the essential cause explained, what can be done? Can we restore the vitality of the blood? Can we diffuse the

re-action over the whole system, and make it instead of the forerunner of speedy death, the harbinger of returning health? When we can effect one or both of these objects, then we may expect to cure the disease.

It has been observed that violent fever is apt to succeed Epidemic Cholera as well as Dysentery, Apoplexy and the like. The reaction is well marked in the fevers, and they exhibit what is sometimes witnessed in that of Cholera, but without the stage of Collapse being present in the former. There is an evidently excited state of the nervous system present which may be directly caused by an opposite state of the atmosphere to that which exists in the stratum causing Cholera, or it may be that the latter is so modified as merely to produce slight depression of nervous energy which is speedily followed by a powerful re-action constituting fever. I think the latter explanation is most probable, for when the nervous system is excited by a positive state of electricity in the human frame, I am inclined to think that Plague or some other Epidemic may be the consequence, or even exanthematous diseases which are marked, at first, by very high febrile action with sudden depression of the nervous system succeeding it.

A great deal has been written on yellow fever which appears to be generated by some change connected with the atmosphere as regards Caloric or Electricity. In it the action of the exciting cause seems to be witnessed in the chylopoetic organs, particularly the stomach and liver, great congestion exists in both, and at length the black vomiting from the latter puts an end to life. Whether this blood has undergone any change I am unable to say, but if it has, the altered condition of it is probably confined to this important organ, whereas, in blue Cholera, there is universal congestion and loss of vitality throughout the whole mass of blood. The yellow fever may, no doubt, arise from marsh effluvia when intense heat prevails, but remittent fever appears the general effect of such a cause when in an aggravated form, and intermittent when less so. The power of Miasma seems to depend on the temperature, and consequently on elevation, as was amply proved in the West Indies by the late eminent Dr. Fergusson, who found yellow fever at the level of the sea, higher up Remittent, still higher Intermittent; at a higher

elevation Dysentery and the highest step of diseased action was possessed by bad ulcers. The Cholera of 1845 proved amply that elevation was no proof against its attack, and it appeared as violent at Subathoo and Kussowlee as it did at the height of 1,200 and 1,000 feet at Loodianah and Umballah.

Though increase of temperature may cause fever, apoplexy, hepatitis and the like, yet for the great cause of Blue Cholera we must search for a greater cause, and that I conceive is to be found in the Electrical state of the atmosphere.

Even dead animal matter exposed to a Cholera atmosphere is rapidly exhausted of its electricity, and becomes putrid, as has been proved by attaching a piece of meat to a kite.

The state of the atmosphere in Epidemic Cholera is so remarkable that even common soldiers remark it, and during the present Epidemic at Subathoo, I have heard the men making their observations on the subject, and rejoicing when they heard a clap of thunder, assigning the want of it as the cause of the Cholera ! During the Epidemic, the lightning one night was darted in a successive stream on the tops of the mountains, but this did not appear to affect the atmosphere in the vicinity of the Barracks, and it was not until heavy falls of rain had occurred, that the disease disappeared. It was observed at Subathoo, and I believe at Umballah, and other places on the frontier, that the wind seemed to be in some way connected with the Epidemic, and when the East wind set in in the morning, cases were sure to occur, but if it shifted to the west or north west, they were less frequent, or ceased for a time. It is a curious fact in all regions of the world, that the wind blowing from the quarter where the sun rises is apt to cause disease.

It would be interesting to trace this if possible to some known cause. It seems to depend, in some way, on its state of moisture acting on the skin and lungs.

SECTION III.

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***The Proximate or Essential cause of Blue
Epidemic Cholera.***

This, next to the treatment, is the most important subject connected with any disease, and more particularly the one now under consideration.

Cholera, in its Epidemic blue form, has often been denominated *Cholera Asphyxia*, a term which is certainly applicable to the disease as divided into two stages, but when the three are adopted, it is only in the second or that of collapse and the third or that of re-action that Asphyxia is applicable, so far as want of pulse is concerned. The word Asphyxia is, generally, applied to cases in which the pulse ceases from the act of respiration being suddenly suspended by hanging, drowning, suffocation and the like, also where a person has been struck by lightning or by artificial Electricity or exposed to intense cold.

It is agreed, on all hands, that Electricity acts through the medium of the nervous system, and the general opinion is, that the nervous action or energy is analogous to Electricity. so Abernethy and others thought as regarded the vital power, but this great Physiologist saw the necessity of allowing another principle in the human species, namely, the soul. One of the latest writers on nervous agency is Doctor Stark of Edinburgh, who endeavours to prove that the nerves are tubes of a perfectly cylindrical form, and that they are filled with an animal oil, the motion, wave or vibration of which is the cause of both sensation and volition. His experiments and those of others go to prove that the nerves, so far from being good conductors of electricity, are inferior to other parts of the body, such as muscle. Two facts appeared to be established until of late years, namely, that the application of Electricity to the nerves of the muscles of voluntary motion was sufficient to cause that motion after death, and where there could be no volition, and the other was, that a vital or involuntary act could also be produced in

the live subject, by the action of Galvanic Electricity, I allude to the celebrated experiment of dividing the 8th pair of nerves, thereby destroying digestion which was restored by forming a galvanic connection between the cut extremities. The first fact remains unshaken, but experience has shown that simple irritation of the cut nerve will produce a similar effect. Dr. Stark's theory is an ingenious one, and especially where he extends his inquiries to the nervous centres. He found as regarded the brain, spinal Chord and Ganglia that there were two distinct portions belonging to each, namely, the gray external, cortical or cineritious; and the internal, medullary or white. These were already well known to anatomists as regarded the brain at least, but he went much further and actually discovered the texture and disposition of these portions. According to him, the gray portion consists entirely of capillary arteries, while the white is made up of nervous filaments or tubes. These innumerable arteries encircle or embrace in every part of the nervous centres the extremities of the nerves forming the white matter, and this arrangement is beautifully shown in the "Arbor Vitæ" of the Cerebellum where the rays of the gray portion give a visible arborescent appearance.

He has not succeeded in accounting for the cause which generates voluntary motion though he points out the manner in which it takes place by a wave or vibration in the oil of the nervous tubes supplying the muscles concerned in voluntary motion, but how the will acts in causing this vibration he confesses his inability to account for.

His theory, however, of vital or involuntary actions not under the control of the will is in the highest degree ingenious, and even supposing that the nerves are not tubes nor any fluid present, the disposition of the arterial capillaries forming the gray matter of the brain in contact with and embracing the nervous filaments, he ingeniously supposes capable of accounting for vital actions, whether these nervous filaments be tubes containing oil or merely solid matter, they must be acted on by the accompanying capillary arteries and the state of the latter must have a corresponding effect on the former.

He applies his theory to Apoplexy, in which these

arterial capillaries are inordinately distended with blood ; also, to delirium, which every one knows is of two kinds, the one depending on increased arterial action and consequent excitement, and the other on diminished arterial action and a corresponding depression, as well as venous congestion. In the case of typhous fevers, the two states of the sanguiferous system were pointed out by Drs. Hudson and Stokes of Dublin from actual dissection of the brain, and as regards the second kind of Delirium, every one who has seen the brain of a man dying of horrors can bear witness to the truth of the venous congestion. The state of the pulse indicates the two kinds, and becomes a valuable index for the treatment. It is hard and full in the one, soft and compressible in the other. The Lancet must be used freely in the former and stimulents in the latter. Dr. Stark also alludes to the influence which disease of the heart or arterial system must have on the brain and lungs, and also to the manner in which Dyspepsia must be attended by headach, in consequence of the evolution of gas preventing the free use of the Diaphragm and consequently of the heart, thereby disordering the circulation in the medullary or nervous portion of the brain.

Thus far has Dr. Stark gone, and his view is likely to lead to many important explanations as respects both physiology and disease. Thus hiecup is a well known effect of a loaded stomach which acts in preventing the free action of the Diaphragm and heart, and the effect is witnessed in the noisy, sudden and involuntary inspirations. This symptom is again a very fatal one in fevers towards their termination, and depends on the diminished action of the heart and arteries acting on the nerves.

On the other hand, the nervous system has a reeiprocal action on the sanguiferous, and wherever a heart is well developed, as in man and the higher animals, there is an equally well developed brain, while in the lower and less perfect animals, the ganglia supply the place of this great nervous centre.

All this may appear foreign to our subject, but my object is to show what is hardly required, viz, that the heart and brain continually act on each other, but yet the

former can beat and circulate the blood independent of the latter for a short time at least, as is proved by experiment.

When life is suspended by electricity, the blood does not coagulate ; it is, in other words, deprived of its vitality according to John Hunter ; arterial blood supplies all the secretions, and this according to Wilson Philip it does through, and by the influence of the nerves. Dr. Stark's views corroborate this. If this blood be dead, whatever the state of the nervous system may be, no secretion can take place, and the same is applicable to all the vital actions ; and we have shown in the pathology of Cholera, that the apparent vital action of the stomach, bowels, lungs, heart, may be accounted for by the irritation of muscular fibre acted on by the degree of nervous power remaining in the brain, and which actions continue for a shorter or longer period of time according to the state of the muscular fibre and the violence and rapidity of its exhaustion as well as the nervous energy. As repeatedly observed, I have asserted that diminished nervous energy or nervous depression was always followed by congestion, and this long before Dr. Stark's ingenious theory was published and in my work on " the diseases of soldiers in the N. W. P. of India," I have distinctly stated in the article on Delirium Tremens that the more the tone of the nerves is raised, so is the tendency to congestion lessened, and that on this important fact, is founded the true explanation of the treatment in that fatal disease if improperly treated. In Cholera, then, in its blue form, the blood has lost its vitality by the action of a set of remote causes, and this state of the blood is the proximate or essential cause of the disease giving rise to a train of fearful symptoms and changes which I have mentioned in the etiology and pathology. Seeing then that the blood is unfit in such a condition for the performance of vital actions, animal and organic life must speedily cease, and fatal experience proves this to be the case.

In such diseases as Fever and Common or Sporadic Cholera, simple congestion may be assumed as the essential cause, and as it may be removed, so these diseases may be cured, and are cured by the means capable of removing this congestion. But, even in fevers where no blood has been abstracted, the pulse often fails and some

other symptoms of Cholera may be present, such as a clammy skin, irritability of stomach and what is called Diarrhœa, while in Sporadic Cholera all these and spasms may exist, so that in both we may conclude that the blood loses at least a portion of its vitality in a gradual manner. Nay, further, that death in purely febrile disorders without any organic disease takes place in many instances from this cause alone. For it is well known that many fevers prove fatal where no apparent cause can be discovered after death to account for the latter. In Common Intermittent Fever produced by miasma acting on the nervous system, depressing its energy and merely inducing congestion, the latter is removed by an effort of the system termed reaction, and the body is restored to a state of health in a certain number of hours.

Again, in Remittent fever, the reaction is violent and incomplete, being confined to the nervous centres and often destroying life by effusion on the brain.

In both kinds or varieties of fever, however, the vitality of the blood is preserved and the heart beats strongly and efficiently, the arterial blood flows through the system, and as health returns, the vital actions of digestion and the peristaltic motions of the bowels are restored, as evinced by the return of appetite and feculent evacuations.

The vital actions then in fever are diminished, in Blue Cholera they are destroyed, and hence the one disease is a curable one, in most instances, while the latter is necessarily a fatal one.

In the rare cases of Cholera which recover from the stage of collapse, a reaction is set up which extends throughout the system, and the very act of the circulation of the blood being restored, shows that it has regained its vitality and that congestion is removed. As the loss of vitality in the blood is the essential cause of Blue Cholera, so congestion with perhaps a partial degree of change in the blood may be assumed as that of Common Sporadic Cholera, while congestion alone is sufficient to account for Fevers of the Remittent and Intermittent type, and probably others. In my work already alluded to, I have en-

tered fully into the subject of Fevers and Cholera in its common form, and my opinion of the intimate connection between the two diseases remains unchanged, the great truth that congestion follows on diminished nervous energy was there advanced, and every day's experience goes to prove that the view was correct, though I confess that I could not then satisfactorily account how they should stand in the place of cause and effect to each other, and I here acknowledge my obligations to Dr. Stark for enabling me to clear up the mystery, as well as to the invaluable work of Dr. Billing, which I had not, however, perused when tracing Cholera and Fever to the same essential cause.

Medical men are unwilling. in fact they have been taught not to allow more than one essential cause to the same disease, and this is sound doctrine ; further, it is denied that one and the same essential cause can give rise to more than one disease. These points I readily concede, but I am inclined to think and I believe my readers will do so likewise, that the same cause increased or modified may produce symptoms which distinguish two diseases from each other, and that the treatment or the means employed as a cure in the one will, when increased or modified, remove both. This is no visionary remark, the cure of Remittent, Fever and Common Cholera proves it, for we see that 5 drops of Croton Oil with 3 grains of Opium may produce apyrexia ; while forty drops of the one and 20 grains of the other may be required for curing Cholera depending on a similar but much aggravated essential cause.

My views on Fever and Cholera have been sneered at, but this is the common fate of any new doctrine in medicine. It cannot be denied that Remittent and more particularly Bilious Remittent Fever has proved a very fatal disease under any treatment in the East and West Indies, Java, the coast of Africa and the like ; and that Cholera, in any form, is a very deadly disease ; if, therefore, I can show that in both disorders the remedies employed by me with the view of removing the essential cause have cured the diseases, surely it is not too much to infer that I had assigned the true cause. Medicine is a progressive science and our steps are often slow and imperfect, mine are no exception, for, at first starting I even gave

the distended state of the Gall Bladder as the essential cause of Fever, Cholera and Dysentery ! This was a first step, the second was to discover that it was merely an index of congestion, the third important point was that nervous depression is sure to be followed by congestion, the last and most important one is that the loss of vitality in the blood is the cause of the death of animal and after a short time of organic life or complete death.

CHAPTER VI.

On the treatment of Blue Epidemic Cholera.

It is a common saying when a disease proves fatal, that the patient "had not been seen in time." The remark shows, that great importance is attached to seeing disease in its early stage. If this be true of disease in general, the rule applies with tenfold force in those disorders which, if seen at a late period, are beyond the powers of medicine. We may often cure Fevers, though they have existed for some days, provided the brain is not seriously involved ; inflammatory diseases of internal organs may also frequently be removed, when well established ; but as regards *Blue Epidemic Cholera*, when once in the stage of collapse, we have as yet no means whereby a cure can be with any certainty effected. They have all failed ! Recovery has no doubt, taken place, but this has arisen from the reaction becoming general through the efforts of nature, and so far as I have observed in the present Epidemic, such recoveries were more likely to occur during the silence of night, when nothing was being done for the patient !

It must not be concluded, however, from the last observation, that the act of giving medicines has the effect of preventing this reaction, for in the vast majority of cases of confirmed collapse, death takes place ; nay, we may see every case in succession fall a victim to the number of ten, fifteen, twenty, thirty, forty ! This is a me-

lancholy fact but, nevertheless true, and when the blue skin is present, the index of the loss of vitality in the blood, we have no means, as yet, whereby we can remove the disorder with any certainty. Some have sneered at the distinction between Sporadic Cholera and the disease in its blue form, and assert that the former may become the latter. If this opinion be true, we have erred in nosology in making a distinction without a difference! That such an opinion has been formed, is not to be wondered at, for I have, within the period of four years, seen *every symptom of Cholera present, except the blue skin, yielding to treatment!* There has been not a vestige of pulse, the skin has been cold and clammy, the tongue and respired air equally so, conjee stools, vomiting, cramps, unquenchable thirst, sunken eyes, the nails even purple, but all yielding to the same treatment, and that in every instance! I have been blamed for stating that I had cured *Cholera*, but I appeal to every man in and out of the profession, if I had not sufficient grounds for the assertion, that my remedies did cure Cholera in its Sporadic form, and with every symptom of the Epidemic Cholera present, except, the blue skin. Had I said that my remedies cured the *Blue Epidemic Cholera*, I would have stated a falsehood, but, I distinctly remarked in my work on the diseases of soldiers in the North Western Provinces that I had had no opportunity of testing the treatment in Epidemic Cholera; "but of Cholera occurring sporadically."* That the cases were what is allowed by all to be Cholera, there can be no doubt: we have no other name for the symptoms distinctly and minutely detailed. What is called collapse from fever and dysentery may have many of them present, but the conjee stools and cramps are absent. The presence of the former is allowed by all to be pathognomonic of Cholera, and yet when present, the disease is curable, and that in every case, as my statements will prove. The circumstance of my asserting that I had cured Cholera with croton oil and opium has drawn forth the remarks of anonymous writers, and I regret they did not come forward in their own names; I am not annoyed by the letters that have appeared in the *Delhi Gazette*, further, than when such epithets as "Subterfuge" are employed to myself and "Brahmince Bull." The gentleman who writes under the latter title is not one of those who takes

* "Practical observations," p. 72.

any man's *ipse dixit* for doctrine. Either he or his friend has repeatedly seen me on my way from the Hospital after effecting a cure in a Cholera case. I have repeatedly explained the treatment, described the symptoms, convinced my hearers that I had cured Cholera in the acceptation of the term by every one in and out of the profession. What B. B. wrote, I have often expressed, and as far as my experience goes, I might still, express that I had cured every case of common or Sporadic Cholera, and being astonished at the same means not being employed by others ! But they have been used, and that with success, even by one of the writers who assailed B. B. and sneered at me. He owns with the intention of showing B. B. and the public that my remedies have been employed, that he had actually witnessed *a cure* by the latter in a desperate case where the *pulse had ceased*, and this after other remedies had failed ! What conclusion can the public form by this confession from one who is endeavouring to ridicule B. B. and sneer at me, but that in trying to effect his purpose, he has proved the contrary of what he intended, namely, that my remedies had cured Cholera, where the pulse had disappeared, and all other remedies failed ! Had he advanced a step further and said that they cured "Blue Cholera," I would myself have denied his assertion ! So long as my treatment was successful, I followed it, and recommended it to others ; but no sooner did it fail in Blue Epidemic Cholera, than I at once, and *publicly in my own name, acknowledged the fact*, and the remedies became, *then*, as worthless in my estimation as they could do in that of others *when employed in the confirmed stage of Blue Epidemic Cholera*. The writer in the Delhi, says that the cases between June and August at Sabathoo may have been *slight ones*. But how does the fact stand ? Merely that there *were no cases* from June until the 8th August ! Had there been *one*, and had it yielded to my treatment, I would never have asserted that the fatal one in June was one of Epidemic Cholera. This apparently strong assertion on the part of the writer falls to the ground. Some of the anonymous writers assert, that any case of Cholera may become *Blue*, and in consequence, my distinction becomes null and void. Now, in my own practice, I have not observed this phenomenon ; in common, Sporadic Cholera under my treatment, the blue skin has not appeared, tho' the patient may have been ill for hours previous to

my seeing him, and from what I can learn from those who have witnessed Sporadic Cholera, a blue skin is not a marked symptom ; nay, it is not a common one, and further, many have never witnessed it, and though the anonymous writer uses the vague term " may," the more specific one " has" or " does" would carry stronger conviction to my mind and those of my readers.

If then we cure, and thereby remove the essential cause of disease by a certain treatment, and the latter fails in a disorder resembling the former in every symptom, *save one*, what conclusion is to be drawn but that we have not removed the essential cause of the latter and which must necessarily be different from that of the former ? This is undeniable, and *therefore Blue Epidemic Cholera must depend on a different essential cause from the disease in its common form, or if allowed to be merely a variety that cause must be capable in Epidemic Cholera, of setting up an aggravated train of symptoms.*

I candidly confess that I was myself staggered at first, when I saw the remedies fail in Epidemic Cholera, which I had found succeed in every case of common Cholera, and yet not one symptom absent in the latter that existed in the former save the *blue skin* and the spasms in a more severe degree. I should now, however, be more astonished if my treatment succeeded when the vitality of the blood is gone ; that is the great essential cause of Blue Epidemic Cholera, and which renders all our means unavailing, unless we can render the re-action general, which restores the vitality, and thus prevent its partial action on the brain from destroying life in a very short space of time.

The object then in curing Cholera, when fully established is two fold.

First, we must moderate the re-action when it occurs, and render it general over the system, or secondly, we must by some means restore the vitality of the blood.

That these are difficult objects, our want of success in the stage of collapse amply proves.

Seeing then that the cure is hopeless in this stage, we must have recourse to means which will prevent this fatal, partial action from taking place ; for though nature thus, in a wonderful manner, sometimes effects a cure, the very means she employs from our limited knowledge, actually destroys life by a violent and partial re-action ! Could we effect the first object in the cure, we might look on quietly and apply our treatment, but we cannot accomplish this, and since death ensues from our inability to do so, we must turn our undivided attention to accomplish the cure before the process by which this re-action eventually takes place.

From the pathology of Cholera, it will be seen that a flow of arterial blood to the brain occurs just before the stage of Collapse takes place, and that this blood alone retains its vitality. Further, that this process supplies the gray matter or arterial portion of the brain with living blood and that here, alone, throughout the whole system, such blood exists. This is the wonderful and almost fearful way in which nature in some rare cases produces a general re-action, and in many, and perhaps all, a partial one confined to the brain itself, and being thus confined speedily destroys life.

I have shown that this stream of arterial blood is well marked in the early stage of Cholera by ringing or singing in the ears, complete prostration of strength, and that it happens at the end of the stage or that of invasion and is immediately followed by the second or that of Collapse.

Since, we cannot be too much on our guard to see the patient before Collapse occurs, our object must be to prevent this stream of arterial blood to the brain, and in the early stage, a flow of blood, if free and copious, from a vein will often arrest the disease and prevent the stage of Collapse. If a vein be opened at a later period, no blood will flow, or syncope takes place ; and the pulse ceases never to return ! At the outbreak of the disease at Sabathoo in 1845, I bled freely from the arm, and often with success ; and the same was observed at Umballa in Her Majesty's 31st Regiment ; but latterly I found venesection useless, nay, it appeared to accelerate the disease,

and the loss of a few ounces was speedily followed by loss of pulse and Collapse.

In the first instance, where the temporal artery was opened, the lad was suddenly seized with the most violent spasms and grinding of the teeth ; he felt a singing and ringing in the head, complete prostration, and would have fallen down if he had not been supported. Having witnessed the uselessness of venesection, and observing in every case the great congestion and effusion of blood on and in the brain, I immediately opened the temporal artery, and plunged the patient into the hot bath. The arterial blood flowed in a full stream and the spasms subsided, as if by magic. The stomach was freely emptied out, and the pulse became soft and full, while the skin was covered with a copious warm perspiration. The disease was completely arrested and recovery was rapid. Here, the rush of arterial blood was prevented at least, to the extent capable of producing deadly reaction. Acting on this view, I gave direction to my able Assistant Doctor Faithful, who was in Camp watching the stage of invasion, to bleed every man in the temporal artery, and it was done. The result was, that every one in whom the bleeding was free and early, had no further symptoms, though it was deemed advisable to empty out the stomach and restore the tone of the nervous system by means of Quinine and Opium.

Having thus found the practice perfectly successful, I lost no time in communicating the result to the Superintending Surgeon, who, with his usual promptitude, recommended the same at Umballa, but it failed ! and so will every practice if not resorted to early ! The opening of an artery, when the blood merely trickles down the cheek, is about as useless as opening a vein where the venous blood is dead and will not stain the forearm. In the very early stage, venesection will and has checked the disease, but when spasm is present, the temporal artery must be opened without a moment's delay, at least such was necessary in the Epidemic of 1845, and must be in true Epidemic Cholera. The operation is extremely easy, and my Apothecary continued to perform it in every case, and in only one instance was I obliged to tie the artery and that after several days.

The various modes of cure which have been pursued in the stage of collapse have been fully explained in the works on Epidemic Cholera. They have all failed and they have all succeeded. This may appear an anomalous remark, but it is perfectly just. There is no mode of treatment whereby we can, with the least degree of certainty, hope to cure a person in the collapsed state of Blue Epidemic Cholera, though we see how a cure may and does occur by a most wonderful process set up in the brain, but which in general proves fatal, when the re-action is partial and confined to that organ. No remedies which we have tried can produce the effects required, namely to moderate the re-action and render it universal, and yet under almost every mode of treatment recoveries must have taken place, otherwise Medical men would not have been induced to recommend their own peculiar practice. The essential cause of the disease has never been removed by art, else the means found successful in one case must have proved so in all. It may be here observed that such diseases as Fevers are cured by various means, and different Medical men use different modes of treatment, and yet all effect a cure in many cases. This is no doubt true in a general sense, but in a deadly fever like that which prevailed at Kurnaul in the years 1841-2-and-3, the mortality is great and the cure far from certain. Again, in simple Intermittent fever, a cure is generally effected by very simple means, such as an emetic, a purgative and the use of Quinine. Here the essential and remote causes are the same as in the most fatal cases of Remittent Fever, only differing in degree, and consequently the means must be increased or modified. The Lancet is seldom required in the simple Intermittent, but all are agreed that it is often highly beneficial in Remittent Fever, though not always so. There are peculiar Epidemic Fevers which appear in warm climates, and which are styled Remittent and Bilious Remittent Fevers in which the lancet kills. For example, at Nagpore a violent Fever occurs in which the free use of the Lancet is for the most part speedily followed by death, and even in the Kurnaul Fever, bleeding to the utmost extent was by no means successful. As regards Fevers, we must, in removing the essential cause which in those of the Intermittent type including Remittent and Bilious Remittent is congestion, keep our attention directed to two points, namely, the removal of the congestion,

and the restoration of the tone of the nervous system, the depression of which is sure to tend to congestion. The one point is just as important as the other, and unfortunately it so happens that the means used for accomplishing the one object, act directly in defeating the other! This has rendered the cure of fevers, at all times, a matter of the utmost difficulty. We meet with a case of remittent fever in an old or middle aged person; there is evidently great congestion present as evinced by heat of scalp, headach and the like; we bleed freely, the febrile symptoms subside, but yet the case proves fatal! We, in short, remove the congestion, but at the expense of lowering the nervous system to a degree incompatible with life. A still more marked case, as bearing on the subject, is witnessed in horrors; there are heat of scalp, headach, quick pulse, thirst and other febrile symptoms, but yet, if we bleed, death ensues. Though congestion be present in this disease, we are actually obliged to remove the cause of this, namely, depression or loss of tone in the nervous system by repeated doses of Laudanum. Even in fevers with heat of scalp, &c., Lind found opium an almost specific, and how it should be so is readily explained by its action on the nervous system. Were Cholera, in its Epidemic form, dependent on congestion solely for its essential cause, then it might be cured by increasing the power of the means capable of removing this cause in Intermittent fevers and Common Cholera.

The lancet is a powerful means of arresting fevers, and in Cholera, either Sporadic or Epidemic, if a full flow of blood can be obtained, and syncope does not occur, the disease is checked; but, if the blood ceases to flow, or only trickles down the arm, the nervous energy is lost, and every ounce of blood serves but to accelerate a fatal termination, and in Common Cholera, though I have almost invariably opened a vein, the only effect has been to cause a cessation of the pulse in the radial artery, and hasten Collapse. When therefore there are great congestion and an extreme degree of nervous depression, such as occur in Sporadic Cholera, the former must be removed without increasing the latter and the lancet is manifestly injurious, since it is a powerful agent in causing this.

What, then, are the remedies which can accomplish

the removal of congestion without further lowering the tone of the nervous system, nay, actually increasing the latter? A powerful drastic purgative, an emetic, the lancet will all and each remove congestion, but will either or the combination of all cure Common Cholera, if the pulse has ceased? Ample experience has proved that they will not. They merely accomplish one object, they just remove an effect without removing the cause of this effect.

If we could unite with a powerful medicine producing an action both on the stomach and bowels one which would, at the same time, restore the tone of the nervous system and thus accomplish the two objects in view, then we must cure Cholera depending on congestion for its essential cause.

It is easy to make conclusions as to what *may* occur, but, in medicine, nothing but practice can decide the truth of our theories and conclusions.

I candidly confess, that in using Croton Oil and Opium in Cholera and fever I had the removal of the congestion in view; but the opium was combined to prevent the irritation of the Oil, and I even substituted henbane for this purpose. But the rationale of the cure performed by these two powerful drugs is simply, *that the Oil by acting strongly on the stomach and bowels removed congestion, while the Opium restored the tone of the nervous system, and thus the disease was removed, not in one or two instances, but in every case!* Not only this, but as already stated in the preface, *the one medicine counteracted the poisonous effects of the other.*

In the treatment of Blue Epidemic Cholera the same remedies were used, but without success. The nervous energy, instead of being diminished to an extreme degree as in Common Cholera, was destroyed, the blood lost its vitality, and therefore Croton Oil and Opium were ineffectual in removing the essential cause, or in other words restoring the vitality of the blood. In Blue Epidemic Cholera, were it not for the living blood in the brain, death would at once take place, as occurs in persons struck with lightning.

In this fearful disease, we have advanced thus far in our knowledge of it, that the whole nervous energy is destroyed, except that of the brain, which supports organic life. The whole blood has lost its vitality, except the portion in the brain. There is universal congestion present. I have shown, that where the nervous depression is extreme, and congestion universal, forming Common or Sporadic Cholera, the disease may be cured, and if we could devise a means, which, *in addition to the removal of congestion and the exhaustion of the nervous system would restore the vitality of the blood by diffusing the vital blood on the brain throughout the system, we would cure Blue Epidemic Cholera without the occurrence of partial reaction which kills in most instances.*

It is probable, that a highly stimulating matter acting but on the nervous centres would accomplish this third object, whatever the expedient may be, it must be combined with the two drugs which remove congestion and restore the tone of the nervous system which in themselves cure Cholera of the Sporadic kind caused by congestion as the essential cause.

The Electricity abstracted by the great remote exciting cause might be thrown into the system, and it would be worth while to try the full effect of a powerful electrical battery of a strength which would kill a body possessed of its natural share. I am not aware, that this has been tried to the full extent. Both Galvanism and Electricity have been employed, but like Croton Oil and Opium, they must be used to a degree which would destroy life under ordinary circumstances.

The greatest congestion, the greatest depression of the nervous system can be removed, but when the vitality of the blood is lost, death must ensue, except in those rare cases, where, reaction becomes complete. Life is preserved for hours by moderating this reaction, but unless it be extended, death must be the result, after a longer or shorter period.

Having thus shown the hopeless nature of Blue Epidemic Cholera in the stages of collapse and re-action, I must now return to the cure of the disease in the first stage, or that of Invasion.

When Epidemic Cholera breaks out, the first object is to observe the premonitory symptoms which consist *in any ailment*, however trifling. A Medical Officer is to be constantly in the Barracks, or elose to them. In the absence of a Medical Officer, a steady Subordinate Officer is to be stationed, so as to see the individual immediately. The temporal Artery is to be opened, after which the patient is to be sent to the Hospital. On his admission, if the ringing in the ears continue, the Artery is to be again made to bleed, and to assist this the hot bath is to be prepared. After a free flow of blood, the means for removing congestion are to be used, namely, five drops of Croton Oil and a drachm of the Tincture of Hyoseiamus. This dose is to be followed by the same quantity of the Oil and three grains of Opium. When the vomiting has subsided and merely weakness remains, the Quinine and Opium are to be combined in the proportion of 5 grains of the former to 3 of the latter, and a laxative is to be administered, such as half an ounce of Castor Oil and half a drachm of the Tincture of Assafoetida. The diet must consist of animal soup, and no solid food is to be allowed, for the latter has, on some occasions, caused a relapse. The powers of digestion are greatly impaired, and it is unsafe to allow any solid ingesta for several days. If any headach, or febrile symptoms occur, large numbers of leeches are to be applied to the head, and if any Diarrhœa take place with pain in the abdomen, numerous leeches are to be applied as well as hot fomentations with turpentine, and anodyne injections of half a drachm of Opium in two ounces of mucilage thrown up.

I shall now give the cases of Cholera in which the temporal artery was opened.

CASE I.—William Murphy, Bugler 9th Company 1st European Light Infantry, aged 19 years, admitted 21st August 1845.

This lad, while attending his brother, a patient in Hospital from Epidemic Cholera, was suddenly seized with the disease and the spasms were most violent in a few minutes. A vein was opened, but as the blood did not flow freely, the Temporal Artery was opened, and after a short time, the blood flowed in a full jet until lbiiss were

obtained ; the spasms subsided almost immediately and the scalp became cool ; he took the Croton Oil 5 drops and Tincture of Henbane a drachm, by which the stomach was well cleared out ; the skin became moist and warm.

22nd.—Makes no complaint.

23rd.—T. loaded ;

R. Ol. Ricini, Ag. Menthæ ãã half ounce.

31st.—Discharged.

CASE II.—John Connors, Private, 9th Company 1st European Light Infantry, aged 23 years, admitted 21st August, 1845.

Aug. 22nd.—Admitted last evening at 10 P. M. had been bled in the Temporal Artery and vein to the extent of lbs IV. On admission he complained only of sickness and giddiness ; has slept and the pulse is now good ; took the draught of Croton Oil and Tincture of Henbane once and vomited freely : T. still cold ; skin warm ; head cool ; makes no complaint.

25th.—Discharged.

CASE III.—John Scott, H. P., Bugler, 9th Company 1st European Light Infantry, aged 11 years, admitted 24th August 1845.

Aug. 24th.—Admitted in the middle of the night and was bled to a pound from the Temporal Artery, when the vomiting and purging ceased, P. is now good, took the usual draught.

29th.—Makes no complaint. Discharged.

CASE IV.—Thomas Mason, Serjeant, No. 6 Company, 1st European Light Infantry, aged 45 years, admitted 24th Aug. 1845.

Aug. 24th.—Admitted at 4 A. M., had been ill for 24 hours. No blood could be obtained from the Artery and he expired at 11 A. M.

CASE IV.—Thomas Davis, Private, No. 5 Company,

1st European Light Infantry, aged 24 years, admitted 25th Aug. 1845.

Aug. 24th.—Admitted after having been bled in the Temporal Artery freely; the symptoms of Cholera subsided and the skin is now warm.

Sumat Opii (Hill) gr. vi.

27th.—Has some giddiness and a bitter taste in the mouth, took Caster Oil this morning which has operated.

28th.—Is bilious and the bowels are loose.

Sumat Sulph. Quin. gr. v.

Opii gr. iii.

29th.—B. not moved, doing well.

Sept. 1st—Discharged,

CASE V.—James Lally, Private, No 8 Company 1st European Light Infantry, aged 22 years. Admitted 24th Aug. 1845.

Aug. 24th.—Was seized in camp with looseness, vomiting, ringing in the ears. Bled immediately from the Temporal Artery, the skin is now warm and P. good.

25th.—Has some looseness of the bowels and the Pulse is small. P. M. Feels better after having taken 6 grains of the Hill Opium.

Sumat Sulph. Quin. gr. v.

Opii gr. iii.

27th.—Makes no complaint.

Sumat Infus, Chirayitæ 2 ounces.

ter indies.

28th.—Continues to improve.

Nulla Medicamenta.

29th.—Discharged.

CASE VI.—William Gray, Private No. 5 Company, 1st European Light Infantry, aged 36 years. Admitted 24th August 1845.

Aug. 25th.—Admitted between 6 and 7 A. M., last even-

ing in complete collapse, he never rallied and died about 4 A. M., this morning, an attempt was made to bleed him in the Temporal Artery.

CASE VII.—Patrick Donnaghue, Private, No. 5 Company, 1st European Light Infantry, aged 37 years. Admitted 25th August 1845.

Aug. 25th.—Admitted at 4 A. M. this morning with ringing in the ears and looseness in the bowels, which latter appears to have been on him during the night. The stools conjee ; skin cold and the P. scarcely to be felt. A vein was opened in both arms and the Temporal Artery on both sides, but the blood did not flow freely and exhibited the true colour of Cholera blood. The stomach was emptied freely, but he speedily became collapsed ; there was some heat of scalp. Died about 8 A. M. N. B.—The blood obtained from this man, though dark, yet coagulated and the little blood obtained appeared to remove the ringing noise.

CASE VII.—Molloy, Private, No. 8 Company 1st European Light Infantry, aged 29 years. Admitted 25th Aug. 1845.

Aug. 25th.—Admitted this morning with cramps and purging, was bled in the vein and Temporal Artery to the extent of lb.iii, and took the draught. P. is now good and he makes no complaint.

Sumat Opii gr. iii.

Sulph. Quin gr. v.

27th.—B. open, skin cool, P. good.

Nulla Meda.

29th.—Discharged.

CASE VIII.—James Magrath, Private, No. 5 Company 1st European Light Infantry, aged 25 years. Admitted 25th Aug. 1845.

Aug. 25th.—5 P. M. Is just admitted, was bled before admission from both the arm and Temporal Artery and

on admission to Ibihi from the latter. He took the draught and the P. became good and the skin warm.

26th.—Vomitted freely, P. good, skin warm, slept soundly.

Sumat Ol. Ricini.

Ag. Menthæ āā ½ ounce.

27th.—B. open from the oil.

Nulla Meda.

28th.—Slept well, B. not moved.

29th —B. costive, feels better.

Repet. Haustus ex Ol. Ricini.

31th.—The medicine has not yet operated.

Repet. Haustus.

Sept. 1st—Discharged.

CASE IX.—George Monro, Private No. 1 Company 1st European Light Infantry, aged 26 years. Admitted 26th August 1845.

August 26th. Admitted this morning : he was bled in both the arm and temple, but never rallied and died about 2 P. M.

N. B. It appears that this man had been drugged by a Fukeer who lives on the Hill near the Barracks, and what is rather extraordinary, he left all his property to this native. The Fukeer seeing that he made no progress in a cure, gave up the case, in order that his patient might die under the Doctor's hands !

CASE X.—James Denniss, No. 2 Company 1st European Light Infantry, aged 24 years. Admitted 27th August 1845.

August 27th. Admitted in the stage of invasion, complaining of nausea, was bled in the vein and temporal Artery : makes no complaint now.

Sumat Opii. gr. iii.

Sulph. Quin. gr. v.

29th.—Discharged.

CASE XI.—Michael McGhee private No. 5 Company 1st European Light Infantry, aged 24 years. Admitted 26th August 1845.

August 27th.—Admitted in the stage of invasion complaining of nausea, oppression of breathing and general debility. Was bled in the arm and temporal Artery to the extent of lb. iii. took the draught and vomited freely.

31st.—Discharged.

CASE XII.—William Robertson, private No. 9 Company, 1st European Light Infantry, aged 25 years. Admitted 27th August, 1845.

August 27th. Admitted this morning in the stage of invasion with nausea and cramps, was bled in the arm and temple freely and took the draught, P is now tolerably good, no headach, skin cool, T. cold, on admission.

Sumat Sulph. Quin., gr. v.

Opii gr. iii.

Discharged.

CASE XIII.—Charles O'Shaughnessy, Corporal No. 4 Company, 1st European Light Infantry, aged 24 years. Admitted 27th August, 1845.

August 28th.—Admitted about midnight, was bled, both from the vein and Temporal Artery, makes now no complaint, the symptoms were pain and ringing in the head, looseness and vomiting.

Sumat Opii, gr. iii.

Sulph. Quin. gr. v.

29th. Took oil this morning ; feels quite well.

Repit. Quin. et opium.

30th.—Makes no complaint.

Sept. 2nd.—Discharged.

N. B.—This man was re-admitted in consequence of profuse hæmorrhage from the Temporal Artery, which could only be arrested by tying it. This was the only instance in which it was necessary to employ a ligature.

CASE XIV.—George Nelson, Corporal No. 5 Company, 1st European Light Infantry, Aged 22 years. Admitted 28th August, 1845.

August 29th. Admitted yesterday in the stage of invasion. P. small, skin cold, also the tongue; was bled freely from the vein and temporal artery in the hot bath; the stomach was emptied out by the draught, some sinking of the eyes. P. now good, the blood drawn is dark-

Sumat Sulph. Quin. gr. v.
Opii gr. iii.

31st. Complains only of debility.

Repet. Medicamenta.

Sept. 1st. Discharged.

CASE XV.—James Powell, Private No. 7 Company, 1st European Light Infantry, aged 30 years. Admitted 30th August, 1845.

August 30th. Admitted in the stage of invasion, was bled in the temple. P. now tolerably good, skin warm.

Noon.—Has slept for the last two hours, skin hot, P. good.

Applii. Hirud. xvi temporibus
Sumat ol. Ricini. Ag. menthæ ā ā ½ oz.

Sept. 1st.—Has giddiness and some heat of scalp.

Sumat Sulph. Quin. c. Opio.

2d.—Discharged.

CASE XVI.—Henry Large, Private No. 8 Company, 1st European Light Infantry, aged 24 years. Admitted 31st August, 1845.

August 31st.—Admitted from guard about 12 o'clock in the state of invasion, says he has been purged two or three times and has had two stools since admission. Skin rather cold and clammy, complains of no pain in the head, but of severe griping, P. feeble.

Fiat V. S. ad lb ii.

Habeat statim, Haust. ol. Croton C.

Applii. Hund, XLVIII temp.

Etiamque Abdomini.

30m. after 12.—Has taken the draught & vomited freely, feels more comfortable, P. still small, has no cramps.

Sumat Haustus ex

Tinct. Hyosc. 1 drachm.

Pil. Hyd. gr. iii.

Mist. Camphoræ 1 oz.

1 o'clock.—Feels much easier. T. warm. P. feeble. Skin warm and covered with moisture.

2 o'clock.—Has not been purged since taking the draught, T. and skin warm, says he feels much more comfortable, but still has a griping pain.

5 o'clock. Feels much easier, has slept a little. Skin and temples warm, has thirst, P. pretty good.

Sept. 1st.—Complains of pain in the abdomen, has thirst, head easy, skin hot.

Repet. Haustus

Applic. Hirud. xii. Abdomini.

Foveat Abdomen et Applic. Liq. Lytta

P. M. Pain of abdomen less, has slept.

Sumat ol. Recini.

Ag. menthæ ãã ½ oz.

Tinct. Hyosc. 1 drachm.

11 P. M.—Feels easy, but says he has slept but little

P. quick. B. have been moved three times since taking the oil ; has no pain or uneasiness in the head.

Habeat Haust. Anod.

3rd.—Has no local pain.

5th.—Feels better.

Nulla Meda.

10th.—Discharged.

N. B.—It is doubtful from the statement of this case drawn up by Dr. Glennie, whether or not the Temporal Artery was opened. Be this as it may, the Lancet and Leeches were eminently useful in preventing determination to the head and removing congestion from the Abdomen.

CASE XVII.—William Heaney, Private Rifle Company, 1st European Light Infantry, aged 23 years. Admitted 31st August, 1845.

August 31st.—Was admitted about 10 o'clock into the Hospital. He has purging with tenesmus, was bled in the arm and temple to Syncope. Skin at present clammy, but not cold. T. warm, P. small.

Habeat Statim

Haust. ol. Croton C.

2 P. M.—Has vomited freely and been purged once since taking the draught. Skin and tongue warm. P. good.

5 P. M.—Feels very easy and comfortable. Has had no purging or vomiting since 2 o'clock. Skin and tongue warm. P. good, no headach or pain in the abdomen. Has no cramps.

Habeat Haust Anod.

September 1st, 5 A. M.—Much the same as in last report.

Sumat Sulph. Quin copio.

2nd.—Has some headach.

Hiriud. xii temp. Sumat ol. Ricini ½ oz.

6th.—Discharged.

CASE XVIII.—James Swift, Private, No. 4 Company 1st European Light Infantry, aged 28 years. Admitted 31st August, 1845.

August 31st.—Was admitted about 7 P. M. with incipient symptoms of Cholera. Was bled in the Barracks from the Temporal Artery and took the croton draught, after which he vomited freely.

September 1st.—Has slept well during the night and makes no complaint. Skin and Pulse natural, skin warm and moist.

Sumat Sulph. Quin copio.

3rd.—Discharged.

CASE XIX.—John O'Brien, Private, No. 8 Company 1st European Light Infantry, aged 27 years, admitted 31st August, 1845.

September 1st.—Had nausea and cold tongue, was bled freely and took the draught; had also the Turpentine enema. B. freely moved.

2nd.—Has a jaundiced appearance, but makes no complaint.

Sumat Calomel 1 scruple,

Pil. Hyd. gr. v.

10th.—Discharged.

CASE XX.—Duncan Maclean, Private, No. 9 Company 1st European Light Infantry, aged 23 years. Admitted 1st September, 1845.

September 1st.—Has been suffering from looseness. T. cold, also the skin, p. tolerably good.

Mittatur Sanguis.

ex Arteria temporalis,

etiamque e brachii vena.

11 A. M.—Has been bled to lb iii, P. small; has some pain in the left temple.

Applic, Hirud xii temp.

NOON.—Head easy. No return of looseness.

Sumat Haustus ol. Ricini.

3d.—Has some giddiness. B. rather loose with tenesmus.

Repet. Haustus.

Sumat Sulph. Quin. copio.

4th.—Has some giddiness and the bowels are rather loose.

Applii Hirud. xii temp.

5th.—Is deaf on the left side, in other respects better.

Sumat ol. Ricini $\frac{1}{2}$ oz.

Tinct. Hyosc. 1 drachm.

6th.—B. less lax : complains only of debility and some deafness.

Sumat Mist. Quin. C.

8th.—Complains only of debility.

Repet. Meda.

10th.—Discharged.

CASE XXI.—Peter Grant, Private, No. 8th Company 1st European Light Infantry, aged 23 years. Admitted 1st September, 1845.

September 1st.—Admitted this morning in the stage of invasion, complaining of nausea and general debility : was bled in the Temporal Artery before admission and has taken the draught of croton oil and Tincture of Henbane.

Sumat Haust. ol. Ricini C.

2nd.—Has cough and headach with heat of scalp.

Mittatur Sanguis.

Repet. ol. Ricini.

3rd.—Has heat of Scalp and giddiness.

Applic. Hirud. xx temp.

Sumat Calomel gtt. xx.

Ext. Hyosc. gtt. v.

Ol. Croton gr. v. in

forma pil.

4th.—Heat of Scalp remains.

Repet. V. S.

Sumat Haust. Sennæ C.

5th.—Has no headach, B. costive, skin hot.

Repet. Haust.

10th.—Continues to improve,

12th.—Discharged.

N- B.—This case assumed the febrile form, which prevailed as the Epidemic subsided and the free use of the Lancet was therefore required.

CASE XXII.—Edward Humphry, private No. 3d Company 1st European Light Infantry, aged 26 years. Admitted 2nd September 1845.

September 2d.—Admitted in the stage of invasion with nausea and cold Tongue ; was bled in the temporal artery.

3d.—P. good, skin warm : has some catarrhal symptoms. B. open.

Re. Tart. Antim gr. iii.

Sulph. magnesicæ ½ oz.

Tinct Digitalis 1 drachm.

Aguæ 15 oz. M.

Sumat æger oz omin hora.

4th.—Makes no complaint, cough slight.

Repet. Mist.

5th.—Has pain in the region of the liver and transverse colon increased on pressure.

Sumat Haust ol. Ricini C.

Appli. Hirud XX. parti dol.

6th.—Has uneasiness in the liver.

Appli. Empl. Syttæ.

Sumat Pil, Calomel. gr. ææ.

Eat. Hyosc. gr. v.

Ol. Croton gtt. v.

13th.—Has had leeches applied repeatedly since last report. Feels now quite well. Discharged.

CASE XXIII.—James Barlow, Private No. 7 Company 1st European Light Infantry, aged 29 years. Admitted 2d September 1845.

September 2nd.—Admitted about sunrise with symptoms of Cholera, looseness, headach, general debility. Was bled in the temporal artery, took the draught.

10th.—Discharged.

CASE XXIV.—Stephen Foudan, Private Rifle Company 1st European Light Infantry, aged 23 years. Admitted 3d August 1845.

September 4th.—Admitted last evening in the stage of invasion marked by nausea, headach and general debility, was bled from the temporal artery. P. now small and soft, skin warmish, has taken the draught and the B. have been moved, no headach now.

Sumat Sulph Quinin gr. v.

Opii gr. iii.

5th.—Had some purging during the night.

Sumat Haust Ol. Ric. C.

6th.—Improving.

8th.—Had some febrile symptoms during the night with pain in the limbs.

Repet. Haust ol. Ricini. C.

12th.—Improving.

Nulla Meda.

13th.—The temporal artery, in which he had been bled, broke out afresh this morning; in other respects doing well.

15th Discharged.

CASE XXV.—William Woodmansëy, Private No. 2 Company 1st European Light Infantry, aged 28 years. Admitted 5th September 1845.

September 5th. Noon. Seized with vomiting, purging and cramps about 5 hours after admission from the Barracks, where he had been bled in the arm.

Mittatur sanguis ex Arteria.

Temporali, statim.

Sumat Calomel gr. xx.

Ol. Croton gr. v.

Ext. Hyosc. gr. v.

2 P. M.—Skin warm and moist, slept for about 2 hours.

3 P. M.—Feels sick, skin rather cold, P. feeble and quick, countenance anxious.

Sumat sulph quin copio

6th.—Has had no return of cramps, vomited once, skin warm, P. quick and feeble, complains of thirst, T. warm.

Sumat Haust Anod.

10th.—Discharged.

N. B.—The stream of blood from the artery acted instantaneously in arresting the disease.

It may, perhaps, be observed regarding the preceding cases that they were slight ones; or that the Epidemic was subsiding and the disease, therefore, more easily subdued. Those who have witnessed much of Epidemic Cholera are well aware of the insidious nature of the complaint, and it has been always observed that the great feature of this deadly disorder was the slight beginning which, in a few hours might prove fatal, to say, therefore, that cases are slight during the prevalence of Blue Epidemic Cholera, and in consequence easily cured, is merely stating that the cases have been seen early in the stage of invasion; such cases are as sure to proceed to the stage of Collapse as if the blue skin had already appeared. That the Epidemic had not subsided and was equally severe as in the first case, the two following fatal ones will amply prove

Case XXVI.—James MacVaigh, Private No. 4 Company 1st European Light Infantry, aged 23 years. Admitted 5th September 1845.

Admitted with well marked vomiting and cramps; was bled in the temple and vein, while in the hot bath, took also the draught and vomited a quantity of indigested meat, bread, &c. never rallied and died at VII P. M.

I may here give the post mortem examination of this case, 20 hours after death, as it was the last fatal case examined.

Head.—The Brain, on removing the skull cap, presented a blue appearance like that of the surface of the body. The vessels of the Dura mater were greatly distended and congested. Blood of a dark colour was effused on the surface of the membrane; and in cutting into the substance of the brain, innumerable spots of florid blood were observed. There was serous effusion in the lateral ventricles and blood in the base of the skull.

Chest.—Contrary to all former cases, the lungs were crepitant and not congested.

The heart was filled with Cholera blood, which is a dark fluid, but appears like red current jelly by reflected light when poured on the table and stirred, and readily

regains the bright vermilion colour of Arterial blood on the admixture with it of a little common salt, calomel produced the same effect, but much more slowly.

The following is the last well marked case of the blue Epidemic Cholera that appeared at Subathoo in 1845, and is here inserted as shewing that the symptoms were as well marked as in the first, and the treatment in collapse equally useless. The Temporal Artery was not opened, for the disease was supposed to have taken its departure ; had arteriotomy been had recourse to in the stage of invasion, the result might have been different.

CASE XXVII.—James King, Private, No. 2 Company 1st European Light Infantry, aged 21 years. Admitted 7th September, 1845.

September 7th.—Was admitted about 3 A. M. with confirmed symptoms of cholera. He was bled to about lb iii. Has now no pulse ; skin blue ; has no headach. Tongue quite cold, some oppression of breathing.

Sumat Pil, Croton, et opii

9 A. M.—Has taken the pills 3 times since last report along with effervescing draughts, but no change has taken place in the symptoms, the breathing is still oppressed ; skin and nails blue ; fingers bent and the integuments over them shrunk. Tongue and expired air cold as marble ; not a vestige of pulse. The spasms have completely subsided, and so have the vomiting and purging. He complains only of the pain arising from a blister which had been applied to the chest. Here is a case exemplifying the truth of what has been so often remarked, that though the temporary symptoms of vomiting, purging, cramps may have subsided, the permanent ones of want of pulse, cold, clammy, blue skin and no secretions still exist, evincing the loss of vitality in the blood. The oppression of breathing marks the fatal re-action which will soon destroy the brain and its functions, and then life will be extinct, the heart will cease to beat and the lungs to respire.

30 minutes after 9.—Voided a few drops of urine and

there is a little warmth in the tongue and tips of the fingers ; all the other symptoms remain as in last report.

11 A. M.—Has just expired.

During the 7th September, eases were admitted, but they partook of the symptoms of fever mixed up with those of Cholera, and were, apparently, those of the Epidemic fever which follows this disease in its Blue Epidemic form. These fevers were observed at the stations on the frontier and upwards of ninety eases occurred in the 1st European Light Infantry from the 7th September until the latter end of October, when the disease ceased. At Loodianah, however, this Epidemic continued to rage during the month of November and proved very fatal among the natives. No fatal case occurred at Subathoo among the European soldiers during the period alluded to, which is only to be accounted for from the free use of the lancet and leeches as well as remedies acting successfully in removing the congestion.

It will be seen by a reference to the eases, now given, that the chief reliance was placed in arteriotomy employed early, and when the rush of blood to the brain was thereby arrested that the remedies used were those adapted for the removal of congestion and the restoration of the tone of the nervous system. The Croton Oil united with Opium and Henbane was used for the former purpose, and Quinine and Opium for the latter. Whether the disease be Common Cholera, or the Blue Epidemic, the use of Quinine and Opium is equally imperative ; for the loss of tone in the nervous system must be immediately restored, otherwise a relapse is almost certain ; not after a lapse of hours like a paroxysm of fever, but in a few minutes, and the pulse which had returned and was found beating may suddenly cease, never to return if the patient is not carefully watched and the Quinine steadily administered at short intervals, when the pulse begins to flag. The use of Quinine has a marked effect on the pulse, but this it seems to produce through the medium of the nervous system ; it restores the tone of the latter and the congestion in the circulation is thereby removed. Opium is a powerful tonic, and as such, its effects in Cholera are, no doubt, great, when combined with Croton Oil, it must act in the double capacity of sedative

and time preventing the irritating effects of the oil, and at the same time restoring the lost tone of the nervous system. In this way, the combination is highly useful in the treatment of fever. The action of the Stomach is of the utmost importance in removing congestion, and the sulphate of zinc was found, I believe, useful at Umballa, so has that of Tartar Emetic on many occasions; likewise, Ipecacuanha and other Emetics; they may all succeed when congestion alone is to be overcome and when the Lancet has arrested the rush of blood to the brain and previous to the loss of vitality in the blood, this they cannot restore, and must fail like all other remedies with which we are acquainted.

The treatment then of the Blue Epidemic Cholera such as it appeared on the N. W. Frontier in 1845 is to be attempted in the stage of invasion by the use of the Lancet in opening an artery or vein, though the former is evidently the most efficacious; but, to insure success from either, the operation must be performed early in the stage of invasion; if at a later period, when the brain is oppressed with blood, the abstraction of it in any way appears to accelerate death, though in a hopeless case, it may be tried, since a full stream of blood is well known to arrest the disease in any stage; and during the present Epidemic, blood was abstracted from a vein in the arm by Mr. Hinton, even after the blue skin had begun to manifest itself and with success; the bleeding, in no case, kills the patient, and he will die whether it be employed or no. It may save life, and when it fails, all that can be laid to its charge is that of accelerating death, as regards common cholera depending in congestion for its essential cause, though bleeding appears to accelerate the cessation of the pulse, yet the restoration of the latter does not appear more difficult than where no blood had been abstracted.

When blood has been freely abstracted, either from a vein or artery, the action of the stomach is to be brought into requisition by a powerful emetic such as Croton Oil, Tartar Emetic, common salt, Sulphate of zinc or Ipecacuan, and as will be seen, I employed the first, after the Lancet, combined with opium or henbane.

To accelerate the bleeding from either vein or artery,

the patient should be plunged into the hot bath, the temperature of which should be as high as he can bear, and this immediately on his admission; the bleeding is to be continued in the bath, and it has been found, that the blood from the Temporal artery which was sluggish will speedily flow in a continued stream when the patient has been immersed in the hot water. The vein or Artery should be opened before the patient reach the Hospital, for it is too often useless if delayed so long, but when bleeding has not been had recourse to, or should it be deemed necessary to repeat it, the hot bath will be found a great auxiliary and should be always ready. When the Pulse is full and soft after the bleeding, and evacuation of the stomach, the opium and Quinine are to be administered, and the case watched narrowly. If headach is complained of, the head is to be shaved, and repeated Leeches applied to the Temples and nape of the neck. The bowels must also be attended to, and our best endeavours used to restore the tone of all the vital functions. Should there be any oppression of breathing, a blister to the chest is required, and if pain exist in the abdomen, Leeches and the Turpentine fomentations are to be employed and a hot saline enema thrown up to which 2 drachms of Tincture of Henbane are to be added. For quenching the thirst, effervescent draughts are always highly relished.

I have repeatedly tried the effects of Nitric Acid in the stage of collapse, as well as Blisters and Sinapisms, but they never appeared to have the slightest effect, nor is it to be expected that they ever will in rousing the system filled with dead blood; we must restore the vitality of the latter, and render the partial re-action general, two objects not at present obtainable by any means in our power, and therefore all these remarks are applicable to the disease in the stage of invasion. The shock of a large electrical battery might, certainly, be tried in collapse with the view of supplying the lost electricity, and which appears to cause the death of the blood, but it will not be from the contents of a jar or two that such an effect can be expected, but from a battery capable of destroying life were the body in possession of its usual quantity of electricity in the same way as poisonous doses of croton oil and opium are required in common Cholera for removing congestion and restoring the tone of the nervous system. Electricity, Galvanism and Electro-magnetism

have all been tried, but neither one or all will cure Blue Epidemic Cholera, unless, used with a power that would destroy life under ordinary circumstances.

Since the stage of reaction is the last and fatal one in Blue Epidemic Cholera, and death then takes place from the violent and partial action on the brain ; further, that when this action can be modified, life is prolonged for hours ; it must be evident, that if we could apply any remedial means, whereby the effect would be sudden and complete, death might be averted by causing a general reaction throughout the system. I have stated, that if we could render this partial reaction general, a cure might be looked for, and it would appear, that this object may probably be obtained by easing the bare scalp in ice. Cases are on record, where the application of ice in this manner has caused the pulse to return, thereby evincing that the living blood in the brain had been distributed to the system, and its partial and fatal action thus removed from the brain. The almost specific effects of ice in violent fever proves its influence in subduing inordinate arterial action in the brain ; and though, therefore, the idea of applying remedies to the head for the cure of a disease which manifests itself in the stomach, bowels, muscles and the circulation may not have been adopted from any preconceived notion of the seat of the disease, I need not now say, that the practice of applying ice to the bare scalp is not problematical, but founded on a correct view of the pathology of Cholera such as I have endeavoured to explain in this treatise. Ice has been used in febrile affections evincing determination to the head, and with marked, nay, almost specific effect. The heat of the scalp in such instances, no doubt, led to the practice, as well as the known sedative effects of this powerful remedy. If, then, in fever, ice applied to the bare scalp can moderate and subdue the arterial action which, if not moderated and subdued, terminates in effusion, the same principle is equally applicable to the reaction of Cholera which is speedily fatal in the Epidemic kind, and it is to be hoped, that the free and persevering application of ice to the whole of the bare scalp will be yet found the most efficacious remedy in this fatal and intractable disease.

I have repeatedly stated, that our object in the cure of blue Epidemic Cholera is two fold, either to restore the

vitality of the blood, or render the partial and fatal reaction general throughout the system. As we, as yet, possess no means of restoring the life of the blood in the system, unless, as already hinted, powerful shocks of electricity sufficient to destroy life under ordinary circumstances might effect it, we must direct our attention to the second object, namely, that of moderating the partial reaction in the brain, and thus distributing the vital blood from that organ throughout the system. Shaving the head, and the application of hundreds of leeches have evidently had a marked effect in moderating this action, but, in no instance, have I observed the pulse return, by such means when it had once fairly disappeared in Blue Epidemic Cholera. The means, therefore, though producing some effect, were incapable of accomplishing the full and desired one any more than they would in those violent fevers which terminate in effusion on the brain. Tho' not yielding to those means, yet we witness the sudden application of Ice followed by the happiest results, in fever and there is therefore every reason to conclude, that the same remedy will be found efficacious in Cholera, where the reaction is more violent and speedily fatal.

In the treatment of Cholera in its Blue Epidemic form, the resources of medicine have been hitherto eminently unsuccessful; and from the view of its pathology, we can readily see how this should be the case. Instead of applying our remedies for the removal of symptoms such as vomiting, and purging, we must remove the cause, which kills in the stage of reaction, namely, the violent and partial action of the living blood on the brain. In the stage of Collapse, the application of leeches, if they did succeed in abstracting blood, would evidently be useless, nay, worse, and the same is true as regards ice, but no sooner is the heat of scalp felt, than the fatal reaction has commenced, and this is the period when it must be subdued in the brain and rendered general throughout the system.

If I had possessed the means during the late Epidemic, I would certainly have given a full and fair trial to ice in the stage of reaction after I had formed the view I did of the pathology of the disease; should Cholera therefore, appear in its virulent Epidemic form, and seeing that all the remedies hitherto tried have proved

ineffectual, the full effect of ice to the bare scalp should be tried. At most of the stations in the North Western Provinces, plenty of ice can be made in the cold weather; and were it only useful in the violent fevers which commit such havoc among our European Troops, its supply to European Hospitals would be an object well worthy of the attention of Government, ~~as~~ I have remarked in my "Practical Observations," but, if this powerful remedy should be found capable of subduing the reaction in Epidemic Cholera, it is needless to say that its benefits would be incalculable in the treatment of a disease which has baffled the skill of medical men. The cases where ice has been serviceable in Cholera when applied to the bare skull prove, that the disease has something to do with the brain; and though the details of its pathology which I have given may not be such as to meet with the views of medical men, they are still of sufficient importance to show that the circulation in the brain is such as to demand attention to that important organ, and that we must direct our means of cure to it, either in preventing in toto the rush of Arterial blood to it by early bleeding in the stage of invasion from an Artery or vein; restore the vitality of the blood, or moderate, subdue and render general the fatal reaction. To these three objects, our undivided attention must be directed when the disease occurs.

It may be a matter of surprise, if ice shall really be found capable of effecting the last object, that its use has not been more extensive, but in a disease where the brain was supposed to have little or no concern, it was not likely that remedial means would be directed to it.

Many pathologists in India, at least, have been struck with the similarity between the diseased appearances in the brain in fatal cases of Cholera and those which presented themselves in congestive fevers, but yet the pathology of Cholera remained a mystery, and the connection between the symptoms and the state of the brain could not be traced. That the blood had lost its vitality was early supposed by the pathologists in Europe when Oriental Cholera appeared there, and the readers of the Edinburgh Medical Journal cannot have forgotten, that the blue skin was stated to be *an index of this loss of vitality*. In a notice of my work in the periodical alluded to, the

*7: Ice is now allowed
by Government.
- June 1847.*

reviewer resting his opinion on this important change in the blood, could not account for the use of Croton Oil and Opium being so marked; but very justly observed, that the cases seemed to support my views, however inexplicable the *Modus Operandi* might be. I attributed the effects to the full action of the stomach in producing general reaction, and what other effect could be guessed at, when a body pulseless, cold, clammy and cramped becomes in a few seconds, warm, covered with a warm perspiration and free from cramps! Nay, in such cases, though the pulse which might have been first felt on admission had disappeared after the abstraction of a few ounces of blood, still after the free and repeated action of the stomach it returned when general reaction took place, the vomiting, purging and cramps ceased. Yet in Blue Epidemic Cholera, the same remedies failed, though the stomach acted repeatedly. Well then, may the term mysterious be applied to Cholera! It is, at the present day, in its Epidemic form equally fatal as when it first attracted the notice of European Medical Officers, and must continue so, until we can effect the objects of cure so often alluded to.

From the doses of Croton Oil and Opium administered in Sporadic Cholera sufficient to poison people either in health or labouring under ordinary diseases, yet, with the effect of removing this generally fatal one we may rest assured that the use of ice as here recommended will not kill a patient labouring under the reaction of Epidemic Cholera, though it might go far in producing such effect on a person in health. In short, our remedies in Cholera must be of that nature, that their effects are beyond our calculation as applicable to ordinary cases of health or disease, whether as regards the Lancet, Croton Oil, Opium, Electricity or Ice.

While we are thus recommending the application of ice to the bare scalp, it might be worth the trial to apply hot bricks to the feet with hot sand bags to other parts of the body, though these are secondary, and the reaction in the brain must be modified, subdued and distributed to the whole system by means applied to the head itself; unless we can do this or restore the vitality of the blood in the stage of Collapse, we shall, in vain, attempt the cure of Blue Epidemic Cholera.

Great care is to be observed in the diet of patients in whom the disease has been arrested, and no solid food is to be allowed for several days, as any thing disturbing the digestion may cause a relapse ; chicken broth or beef tea may be given, also coffee.

The patient is not to be allowed to leave Hospital for several days, and it would be better were he to remain there until the Epidemic shall have subsided in the Barracks.

CHAPTER VII.

***The means of preventing Blue
Epidemic Cholera.***

When Epidemic Cholera breaks out in a Regiment, all the patients labouring under affections of the bowels which act as predisposing causes, should be removed to another locality, for they are almost sure of becoming victims to the prevailing Epidemic. This was strikingly exemplified in that of 1845 at Subathoo, and I believe at other stations on the Frontier. An Hospital, or building should be set entirely apart for the cases of Epidemic Cholera, and none allowed to enter the same place with the other patients ; for though we may scout the idea of infection, yet the very sight of patients labouring under a fearfully rapid disease has the effect of producing Collapse on men whose nervous systems are depressed through Diarrhœa, Dysentry, or other disease. The cases of this description were no fewer than seventeen at Subathoo, and all of them, with two exceptions, proved fatal. Death did not in general take place rapidly, as in those admitted from barracks or camp ; they lingered on from day to day until, at length, the blue skin was established. After death, the same appearances presented themselves as regarded congestion and the nature of the blood. The Temporal Artery was not opened in any of these cases, some were bled from the vein, but the opera-

tion appeared to accelerate death and the stage of collapse was almost immediately formed. In some, however, death was as rapid as in any of the cases admitted from barracks or camp. When, therefore, a well marked fatal case of Blue Epidemic Cholera occurs, an Hospital for the Cholera patients is to be established, or the ordinary cases of other diseases are to be removed to another building; this is a point of the utmost importance, and had I adopted the measure at Subathoo, the number of fatal cases would have been reduced from 42 to 27, and the average mortality been a fourth, or even a fifth on the admissions.

If such cases are returned under their original designations, a false impression is formed, and no medical man should ever shrink from giving the true name to the disease. It may be fairly asserted, that every death occurring suddenly among patients labouring under bowel complaints and inhabiting the same ward as the Cholera patients fall victims to the Epidemic; and though such may be returned under their original designations, yet the return is not a fair one. In as far as regards such cases at Subathoo, they might have been put down as Diarrhœas or Dysenteries, but such a proceeding would not have given a just and correct view of the case.

In Epidemic Cholera occurring among a detachment of men on the march, a removal to a new encamping ground should always be adopted; and even a Troop or Company of Artillery may be removed from their Barracks in the hot weather; such was adopted at Muttra in 1838, and on previous occasions, and with the effect of getting rid of the disease, though at the risk of inducing violent Fevers.

During the present Epidemic, the men of Her Majesty's 31st Regiment and those of the 1st European Light Infantry were removed from their Barracks, but this was done during the rainy month of August, and it is doubtful if any real advantage was derived in either case, except that the opportunity was, thus, afforded of whitewashing and fumigating the Barracks. During the removal to camp, several men were seized with the Epidemic in consequence of exposure, fatigue and the like, and those from a range of Barrack at Subathoo which had hitherto

escaped, were attacked with Cholera in camp; nay more, on the return of the men to their Barracks, the Epidemic appeared in No. 5 Barrack, which had been exempt, previous to the encampment. The stage of invasion can be much better watched in Barracks than in camp; and since we can in it arrest Epidemic Cholera, the removal of a large body of men to camp, even in the hot weather, is of doubtful propriety, since it is evident the mortality must be greater in camp, if cases do occur, than in Barracks. In the former instance, the case is not seen, until the disease has fairly established itself; in the latter, the premonitory symptoms are watched and taken advantage of.

As it is necessary to remove men labouring under bowel complaint from the vicinity of Cholera patients, so it is advisable to send away Officers whose health has suffered from the same affections. Unfortunately, in the plains of India, this is a matter of difficulty, but at Subathoo, the measure was put in practice, and the Officers were sent to Simla. One Officer who went from Feroz-pore to Simla was there attacked as early as July, for the Epidemic appeared at Feroz-pore in June, and the Officer in question had, no doubt, been within the influence of the exciting cause previous to his leaving the station; and the fatigue and exposure consequent on his trip to Simla, must have, materially, tended to evolve the disease. He fortunately recovered.

The means for preventing the action of Epidemics such as Cholera and Fever, must be even more important than the treatment of such disorders, seeing that the latter is by no means certain, and in Cholera, when once fully established, it is almost useless.

I have dwelt much on the tone of the nervous system as connected with both Cholera and Fever. In the latter disease, though we may get an intermission or remission, yet a paroxysm, or exacerbation is sure to occur, unless, the lost tone of that system be restored.

Of all the remedies given with a view of obtaining this object, Quinine is the most powerful, and ten grains of this valuable Antiperiodic are generally sufficient, if given at once, for preventing a recurrence of the Fever.

Now, in these cases, the depression of the nervous system is considerable; but among soldiers enjoying an ordinary degree of health, there may be only a few whose nerves are at all effected. It is difficult to select such cases, and therefore it appears prudent and advisable, that a portion of Quinine should be given daily to each man during the prevalence of Epidemic Cholera and violent Fevers.

The expenditure would, no doubt, be considerable in a Regiment of European Soldiers, but, when it is considered that each man costs, in a pecuniary point of view, £100 sterling or 1,000 Rupees, and that 50 men may be carried off by Cholera or Fever, we have thus a loss of 50,000 Rupees or £5,000 sterling so that the expense of the preventive will cease to be taken into consideration.

It might, therefore, be worth the attention of the Medical Board and Superintending Surgeons how far a large supply of Quinine might be allowed to each Regiment of European Soldiers in Her Majesty's and the Hon. Company's Service at the commencement of the hot season, for it is too late if we wait for the outbreak of an Epidemic like Cholera.

During the present visitation of Cholera, I gave all the Quinine I had to the men of the Regiment, but, it only lasted for two days. The very idea of taking some preventive has a beneficial tendency on the minds of Soldiers and others; and were the effects, merely imaginary, some benefit might accrue. The prophylactic properties of Quinine in Fever of the Intermittent and Remittent kind is acknowledged by all, and it produces this effect by its action on the nervous system, and through it on the circulation and other vital powers, it must exert a similar power in preventing even Epidemic Cholera. I am unable to assert with full confidence, that Quinine will prove a complete prophylactic in Blue Epidemic Cholera, but from what we know of its wonderful powers in Fevers, we are justified in the conclusion that the daily use of Quinine will prove eminently prophylactic when either Fever or Cholera is prevalent. In the instance referred to, its use certainly was most beneficial, and I almost hoped the Epidemic had ceased. I indented for a large supply, but though the Superintending Surgeon allowed the de-

mand, the Quinine did not arrive from the Medical Depot at Agra until after the Cholera had taken its departure. Surely this fact shows the necessity of having a supply of medicines nearer the Frontier than at Agra.

Kurnaul appears in every respect an eligible place, and the Foot Artillery Barracks would form good buildings for the reception of Medical Stores which could be soon forwarded to Umballa, Loodhianah, Ferozepore, and the Hill stations of Kussowlee and Subathoo. At the present time, when so many European Troops are on the Frontier, the measure here recommended seems, particularly called for.*

Many people during the present Epidemic employed "Jeremie's drops," which are supposed to contain Opium in solution. Though Quinine be the most powerful tonic we possess, yet the use of Opium in moderation tends also to produce a similar effect, and in the treatment of Cholera, the combination of the two is perhaps the most eligible tonic that could be devised. When Cholera has been arrested, there is a very great depression of the nervous system present, and in order to remove this, both Quinine and Opium are required. In Dysentery, also, of the chronic kind, where the nervous energy is greatly diminished, the same combination will succeed when the ordinary means fail. The use, therefore, of "Jeremie's Drops" as giving a confidence, and also acting as a tonic must be highly beneficial, and at Umballa I believe their virtues were pretty generally tried; and one fatal case occurred, where the subject would not use the drops and having inadvertently taken some purgative or laxative, and thus gives rise to a predisposition for the Epidemic, the latter was fully established and death ensued.

The best way of taking Quinine as a prophylactic is in solution, for this purpose from one to three grains may be taken daily and the following prescription will answer:—

* The Agra Medical Depot has been, since writing the above, removed to Umballa, the want of one on the Frontier was severely felt during the late campaign.

Re. Sulph. Quin. gr. viii. ad xxiv.

Acid. Sulph. Arom. gtt. viii. ad xxiv.

Syrup. Zingib, 1 oz. M.

A drachm, or tea spoonful contains from one to three grains, and this may be taken every morning. Not only in Epidemic Fevers and Cholera, but also in Dysentry, the daily use of Quinine must be highly useful as a prophylactic, for the tone of the nervous system is lowered in all the three diseases.

Any thing that can assist digestion is of service in maintaining the tone of the nervous system, and every thing that interrupts or retards that process, has an opposite effect. The power of digestion appears evidently weakened during the prevalence of Epidemic Cholera; and the use of solid meat is generally not relished. I recommended that each man in the Regiment should take a strong, warm cup of coffee with plenty of sugar and milk early every morning, or a bowl of animal soup or broth. When the Epidemic occurs, the coffee or soup should be made under the superintendence of a steady Non-Commissioned Officer and his operations attended to by the Officer on duty who should see that the coffee and meat are of good quality.

Instead of eating large indigestible pieces of meat as Soldiers are too apt to do with quantities of raw, ill-baked unwholesome bread, it would be advisable, occasionally, say every second or third day, to give them a portion of spiced soup called mullagatawney with dry, well boiled rice mixed in it.

As regards spirits, two drams daily are ample, and the men of the 1st European Light Infantry at Subathoo were restricted to this quantity during the prevalence of the Epidemic and with the most marked beneficial effects. The men belonging to the Temperance Society, should on no account leave off their temperate habits, and many from doing so, and taking again to their drams have suffered. The regular habits must be preserved; all excesses in eating and drinking avoided; night watching, fatigue, exposure to the sun's rays, getting wet feet, checking perspiration, drinking cold water when the body is heated, eating fruit, vegetables and indigestible substances

must all be avoided. The habit of getting drunk as is common among European Soldiers on the outbreak of Cholera, must be carefully abstained from for there is no one so liable to be seized with Cholera, or any Epidemic as the drunkard whose nervous system has been depressed by the previous excitement caused by liquor. While stating the pernicious effects of drunkenness as regards the common Soldier, and limiting him to two drams, I must warn those who have it in their power to indulge in Wine, Beer, Brandy and the like, that they must not exceed their usual habits in the use of these ; unless the individual takes plenty of exercise, he ought not to use Beer in any quantity, nor even Wine ; a small portion of good Brandy is, perhaps, the safest stimulant when mixed with pure water, both in assisting digestion, and preserving the tone of the nervous system ; but being a stimulant it must be used in due moderation, and its effects are inferior to a tonic such as Quinine.

The truth cannot be too often repeated, that any disturbance in the stomach or bowels is sure to act as a predisposing cause of Cholera.

All purgative, and even laxative medicines must be avoided ; for a loose state of the bowels exhausts the energy of the nerves. If the bowels are loose from medicine or any other cause, the use of opium or some of its preparations is imperative. In my own case, I took 15 grains before the Conjee Diarrhoea was checked ; 3 grains of the Hill Opium may be taken as a dose, and repeated according to circumstances. Though no looseness should be induced, or if existing, should be checked, yet a contrary condition must be prevented by avoiding food which is apt to occasion constipation, particularly milk.

As illustrative of the pernicious effects of taking purgative or laxative medicines, I may here mention the case of a most amiable Lady who, conceiving that she required medicine, took a couple of Pills which operated rather freely, and the purging assumed the conjee-like appearance. Opium and Laudanum were administered, but not in very large quantities, as she was enceinte. The stools continued of the same description for some days and nights, and at length collapse from Cholera was established. There were no spasms, little nausea or vomit-

ing, but the pulse disappeared, the nails became blue, violent reaction took place within the skull, and she died in 14 hours after the stage of collapse was formed. Such cases are difficult of management, and living as this lamented individual did in the vicinity of the Barracks and within the range of the Epidemic, even her condition gave a predisposition to the disease, and it would be advisable in all such cases to remove from the locality to Simla or Mussoorie, until delivery has taken place, or the Epidemic subsided.

Previous to the appearance of Epidemic Cholera at Subathoo, the measles had been prevalent, and several of the Children convalescent from this disease were seized with Cholera, but the mortality was trifling among the Women and Children, and in the fatal cases among the former, the reaction was long continued without being followed by death. This is to be accounted for from the less powerful action of the sanguiferous system. Though females are, therefore, from their nervous temperament more liable to the disease than males, yet I have found during the present Epidemic, that they are much more apt to recover through reaction, and even when the latter terminated, eventually in death, it was much more protracted than in the males. The disease was, also more lingering among the Children, and some lived for several days without hardly a vestige of pulse. The treatment of these little subjects, when labouring under Epidemic Cholera, is a matter of great difficulty. The use of the warm teeth is perhaps the most effectual means with leeches to the temples; in fact, both children and adults require the utmost attention to the head, for, there the cause of reaction exists, and it must be modified and rendered general, if possible. Repeated leeches have certainly a powerful effect in producing a modification, and life by their means is, no doubt, often prolonged, but we do not possess the certain means of diffusing the reaction, and recovery is uncertain.

The free ventilation of air and scrupulous attention to the cleanliness of the Barracks and Hospitals are objects of the first importance in preventing the action of any Epidemic. In the climate of England, we find that the crowded state of prisons and work-houses is, in itself

capable of inducing a pestilential Typhus fever; so that animal effluvia become as powerful as marsh malaria and what is very strange, while increased temperature augments the violence of the latter, a diminished temperature seems actually required for the very existence of the Fever arising from the former. Accordingly we find Intermittent and particularly Remittent Fever common in hot and tropical climates, while Typhus Fever is indigenous to cold and temperate ones.

When Epidemic Cholera appears, the Barracks and Hospitals should be white-washed inside and out, and afterwards fumigated by means of Chlorid of Lime and Sulphuric Acid, a large supply of each should be always kept in store for this purpose; the Cots, Tables, Chairs, &c., should be again placed in the Barracks before the fumigation is begun, and fully exposed to the air while the white washing is being performed. All filth and dirt are to be carefully removed, and no rank vegetation is to be allowed within the vicinity of the Barracks. At Subathoo, the vegetation is very rapid on the Hill during the rainy season, this ought to be removed from time to time and burned, if practicable. Native huts and old houses should be removed from the vicinity of a cantonment, and the roads and thoroughfares kept clean and airy. During the prevalence of Epidemic Cholera, the sale of fruit and raw vegetables, such as Melons, Apricots, Plantains, Cucumbers should be prohibited, and the greatest attention paid to the quality of the Bread and Meat as well as the purity of the water.

Many suppose, that exposure to the sun's rays in the Hills must be less prejudicial than in the plains of India, and it is, therefore, no uncommon sight to witness both men and Officers going about at midday without even an Umbrella. The effect of this indiscretion is to cause congestion of the brain followed by heat of scalp, headach and probably nausea and vomiting as well as loss of appetite; in many cases Fever. The rays of the morning sun are exceedingly powerful at the elevation of Subathoo and exposure to them is the fertile source of disorder in the system during the hot and rainy season. Parades after sun rise should be carefully avoided, until the month of November, and even then the dismissal should take place as soon after the sun is up as possible.

During the Epidemic Cholera of 1815, the native Soldiers on the Frontier were much less liable to the disease than the European ; this was observed, particularly, at Umballa. The Natives believe in the contagious nature of Cholera, and so do the European Soldiers ; and though the point appears to be satisfactorily settled, that the disease is not contagious, yet it is well to guard against any thing which might tend to alarm either the European or Native Soldier. It is, therefore, advisable to destroy the bedding of those dying of Cholera, as well as any clothes which may have been near the individual when labouring under the disorder. None of these articles should be again carried back to the Barracks, since the sight of them and the idea of being near the clothes of a person dying of such a fatal disease produce a degree of alarm which becomes a predisposing cause.

When moving European Soldiers into camp, as a means of preventing the spread of Cholera among them, care should be always taken that they are not located near a body of healthy Natives, as the latter will, invariably, attribute the occurrence of the disease, should it break out to the circumstance of their vicinity to men labouring under the Epidemic. When it was proposed to send the men of H. M.'s 3d Light Dragoons into camp, at Umballa the Native Troopers of the 4th Light Cavalry became alarmed, and had the Europeans actually encamped in their vicinity and Cholera made its appearance amongst them, there is little doubt that the Europeans would have been blamed as the cause of the sickness !

Though recommending the daily use of Quinine as a preventive of Cholera and Fever among the European Soldiers, it is most likely that a little chirayita infused in boiling water and drank early every morning would answer the purpose among the Native Soldiers, or a pill of the Katkaranja (*cocsalpinca bouducella*.) The immunity observed in 1845 as regards the Native Soldiers, is by no means a common feature, since both Europeans and Natives suffer, in general, pretty much alike, though it must be observed that in the article of diet and indulgence in spirits and the like, the European Soldier is more apt to be predisposed than the Native ; but the same men under fatigue are, probably, less liable to be affected by an Epidemic than the Native Soldiers.

At Subathoo, the Natives in the bazar were first attacked, and afterwards the European Soldiers. At Kusowlce, the reverse was observed; for there the Europeans were first affected by the disease. At Simla again the Cholera appeared solely among the Natives, and they became, in consequence, alarmed and many fled into the interior.

The Epidemic Cholera had not visited Subathoo since 1828, or after an interval of seventeen years, when it committed great ravage among the Natives including, I believe, the men of the Nussecree Battalion. The Governor General's Surgeon fell a victim to it. The use of Calomel was then in great vogue, particularly in scruple doses, and this Gentleman conceived that such a quantity taken at bed time would be the best means of keeping off the disease; he not only took the medicine himself, but gave a similar dose to an Officer then residing at Subathoo. During the action of the Calomel, the poor Doctor was seized with the Epidemic and fell a victim to it; the Officer was probably made of "sterner stuff" and fortunately escaped. I trust this melancholy instance will serve to prove, in conjunction with others, the pernicious consequences likely to follow the administration of purgative medicines during the prevalence of Epidemic Cholera, and shew that neither the bowels nor the stomach are to be tampered with.

When the Epidemic Cholera prevails, whether soldiers are in Barracks or camp, a cheerful spirit should be kept up amongst them; and singing, music and dancing allowed in moderation without the accompaniment of drinking. The affections of the mind have a wonderful influence on the body, or, in other words on the heart and the vital actions, and the latter may be just as effectually disturbed by violent mental emotions as by taking anything into the stomach which injures digestion and disorders the action of those two most important vital actions, not depending on our will, but yet like the action of the heart, affected by emotions of the mind. When the individual becomes frightened, the bowels are often affected and stools passed involuntarily. Any loathsome sight is liable to occasion nausea, or fainting. The consciousness of guilt, or the degree of fright consequent on committing a bad action such as theft is well

known to prevent the vital act of secretion, and advantage is taken of the fact for the discovery of such a crime among the natives by placing a portion of rice in the mouth of the suspected individual who, if guilty and not a hardened thief, is unable to masticate it; the secretion of saliva is arrested, it cannot pass into the stomach, and the rice is taken out dry! This shews the importance attached by the natives to strong mental emotions, though they may not exactly comprehend how the cause operates. Many of their modes of cure are sneered at by us, but if we examine a little more attentively into their action, we will then see that they are founded on a deep knowledge of cause and effect. During the present Epidemic, the chief Butcher was seized with it, and relying on the efficacy of making a propitiatory offering to Kali, the goddess of destruction, he had a kid slaughtered over him, and while the warm blood was trickling over his body, the efficacy of the powerful sensation on the mind, and the firm belief in the offering caused reaction, the heart began to beat, the warmth of the skin returned, recovery, in short, took place. In Epidemic Cholera, where the vital powers are essentially concerned, the state of the latter must exert a great influence in causing the disorder, and they must all be attended to in our endeavours to prevent it. The disorder of any of them is a predisposing cause, and the latter may be so great, that it actually becomes an exciting one. How, else, can we explain the following fact for which I am indebted to a Medical friend. When the Epidemic Cholera visited Edinburgh in 1832, the first case occurred in a person who had returned from some of the neighbouring sea ports, where Cholera then prevailed. He returned to his home and there died, I believe. The house was shut up, and strict attention paid, in order to prevent egress and ingress. By these means, the occurrence of Cholera was prevented, or rather the cases were confined to this house for several days, and numbers of the family were seized with the disease. Here, were strong grounds for the contagious or infectious nature of the complaint. But, contagion does not, thus, rapidly evince itself; days are required for evolving its effects. Cholera, in short, is not contagious, and the only way we can explain the occurrence alluded to is by supposing, that the sight of relations dying from such an unusual and unheard of disease must have acted in a very powerful manner on the nervous system, and exhausted its energy

to a degree capable of destroying the vitality of the blood. Had the members of this family been visited and comforted by their neighbours, and had their doors been left open, and intercourse with the world allowed, it is probable, nay, it is certain, that Cholera would not have seized them. But, immured in their miserable huts with their only supporter, perhaps, in the agonies of death from a disease which they had never witnessed nor heard of, and debarred from all intercourse with the living world, the effects must have been great, when thus capable of rendering a predisposing cause the actual exciting one. Sudden and excessive grief and joy have killed; the occurrence is certainly rare, but nevertheless well established; the one destroys life by the sudden depression, and the other by the violent excitement of the nervous system in the same way as the Electrical state of the atmosphere exhausts the nervous energy in Cholera, or increases it to a state incompatible with life when a person is killed by lightning.

It is requisite, therefore, in our endeavours to prevent Epidemic Cholera, that the mind should remain undisturbed, as well as the functions of digestion and the peristaltic motion of the bowels; for they are all vital actions, and exert a mutual influence on each other. People in the enjoyment of health, and with a sound state of the nerves may look on a person dying with Blue Epidemic Cholera with impunity; but, when the system is weakened by any existing disease, or when the nervous energy is constitutionally weak as in women and children, the case is widely different.

The physical powers of the Natives of Bengal are allowed to be inferior to those of the Natives in the North Western Provinces of India, and the circumstance may serve to explain in some measure the greater mortality, from any Epidemic among the former. When Epidemic Cholera breaks out among a body of Natives, the proportion of cases is likely to be greater than among the same number of Europeans; a fourth, fifth or sixth of the latter may be affected, while a whole body of Natives may fall victims to Blue Epidemic Cholera. In 1838, every servant belonging to an Officer at Muttra was seized with it, and every one of them died!

In conclusion, the means adopted for the prevention of Cholera must be strictly founded on the predisposing causes, and every thing which can act as the latter must be carefully guarded against.

If, during the prevalence of Cholera, an Officer is affected with giddiness, looseness, nausea or oppression about the præcordia, he ought to be bled instantly and his stomach well cleared out by a draught of Croton oil and tincture of henbane followed by Opium and Quinine. Should the same symptoms occur in a lady, leeches must be applied to the head and some Opium and Quinine be administered. On no account is a purgative to be resorted to, and Morison's pills must be shut up. Jeremie's Drops may have a beneficial effect, and, however high the reputation of the Medical man may be, should he advise laxative or purgative medicines as a preventive for Cholera, his advice must be rejected.

When nausea is felt, perhaps, there is no more effectual means of removing it than Carbonic acid gas, which may be obtained from a bottle of Soda water, though even this must be used with due caution.

The preserving, and restoring the tone of the stomach are of vital importance, and the Carbonic acid has often removed the disease as witnessed in the practice of Dr. Maxwell and others; but both this and every other means must be employed early, since, Blue Epidemic Cholera in the Stage of Collapse is all but a hopeless case in our present state of knowledge.

CHAPTER VIII.

On the Fever following Blue Epidemic Cholera.

In 1838, when the troop of Horse Artillery was sent across the Jumnah from Muttra in the month of April,

the Cholera speedily subsided; in fact, it is doubtful, if any real case was brought from camp after the first few days. But, though the Epidemic thus ceased, there was a violent type of fever which succeeded, marked by great determination to the head. It was returned as Remittent, but it was not of this type; there was no well marked remission in most instances; it was in fact, a continued Fever, and assimilated to the Synocha of Cullen. I attributed its existence to the intense heat of the sun's rays at such a season and such a hot place, as Muttra, confessedly, is in the month of April. The intense heat of the wind appears capable of setting up a violent fever at such places as Cawnpore; it is denominated Apoplexy, and is about as fatal as Epidemic Cholera itself. How is it, that we do not meet with this violent fever at Agra, Muttra, and Kurnaul in the hot winds? The heat of the wind is as intense at Muttra as we can well conceive. It must be confessed, that in the month of June, fevers of a very violent type do occur at Muttra in certain years; but neither here, nor at Cawnpore, are such fevers observed every year. They occur like the Blue Epidemic Cholera, at certain intervals. They are not, necessarily, preceded by that disease, but they appear to follow it when occurring epidemically.

In the plains of India, the heat alone might be supposed to give rise to such fevers, but in the hills, if this were the remote exciting cause, how did it happen in 1845 at Subathoo, that hardly any cases of fever presented themselves in May, June and July or even August? In September and October ninety cases of fever at least occurred among the men of the 1st European Light Infantry, and this at a time, when the temperature was much lower than in May and June, the two hottest months in the year! Since, therefore, these fevers do not occur every year in the plains during the months of May and June, and do occasionally appear at Subathoo in September and October as witnessed in 1845, what conclusion is to be drawn, but that they depend on some other cause than elevation of temperature. For four years at Kurnaul, namely in 1841-42-43 and 44 a violent and deadly fever prevailed, and in 1844, fever was also prevalent at Umballa. The heat at the former place was much the same as in 1830 31 and 32 and yet Kurnaul during those years was a healthy station; and the records of Her Majesty's 31st

Regiment shew that at no station in India, had the Regiment suffered less from sickness than during these years. There might have been some change in the rainy seasons of the respective years, but even this will not account, satisfactorily, for the great sickness and mortality at Kurnaul in 1841 and the three succeeding years, nor will the influence of the canal, for the latter existed in 1830-31-32 and 33 and the roads in cantonments and the parades were then overflowed as much as in 1841-42-43 and 44. Every thing of a local nature was much the same during the two series of years as regarded temperature, rain and the canal ; and yet, the health of the troops was good in the one, and quite the reverse in the other ; so much so, that the station was abandoned ; and one of the finest cantonments in the upper provinces deserted, and that, probably, unnecessarily. What, then, caused the sickness at Kurnaul in the years alluded to ? If it were malaria, the same cause existed in 1830-31-32 and 33. If the canal proved injurious, why did it not exert the same baneful influence in those years as it did in 1841-42-43 and 44 ? If the heat had an influence on the Fevers of the latter years, why did it not exert the same in the former years ? In 1845, had Kurnaul been cantoned by Troops, would it have presented the same degree of sickness from Fever during the month of August ? No ! The place was not at all sickly from such a disease, but it was visited by the Blue Epidemic Cholera which prevailed on the Frontier. In 1841-42-43 and 44 an Epidemic Fever prevailed at Kurnaul. In 1845, this Fever was succeeded by Blue Epidemic Cholera.

Malaria is allowed to be the fertile source of Fevers of an intermittent type including the Remittent and Bilious Remittent. The existence of the one or other, when this agent exists, appears to depend on the Temperature. A greatly increased temperature may induce fever of the Intermittent kind in subjects who have formerly suffered from it, but in young men who have just arrived from England, and have never been afflicted with such a fever, exposure to the sun's rays raises a febrile action, not preceded by marked rigors as in the Intermittent type. Independent of this exposure to the heat of an Indian sun, there is some other cause which sets up a febrile state, and which comes into action at intervals, and unlike Malaria, may exert its influence where there is no source of

the latter present, namely, in hot and cold seasons. Since such a fever can neither be attributed to heat alone, nor the latter acting on decayed vegetable matter, thereby producing Malaria, what is the Agent? It is not a local cause, else it would exert its influence every season under similar circumstances of the Temperature and rains.

I have endeavoured to shew in this treatise, that a negatively electrified stratum of air is the great remote exciting cause of Blue Epidemic Cholera, but I have not explained how this stratum should exist in 1845, sweeping along the countries of Afghanistan, the Punjab and N. W. Frontier of India, as well as the Doab of the Jumnah and Ganges; I will now endeavour to do so.

The remote exciting cause of the Intermittent type of Fever is something which acts through the nervous system, depressing the tone of the latter; this is followed by congestion and again by reaction, either complete as in pure Intermittent or partial as in Remittent Fever.

The remote exciting cause of Blue Epidemic Cholera is something which destroys the nervous energy, and the vitality of the blood.

The remote exciting cause of the ardent fevers witnessed at the close of Cholera is something which immoderately excites the nervous energy, producing symptoms exactly the opposite to those of Cholera, viz., a quick, hard and full pulse, great heat of surface, no blue skin, no cramps, no vomiting and the secretions continue! Since these effects are the opposite of those witnessed in Cholera, the cause must be exactly opposite, and it is so. A positively electrified state of the whole atmosphere is a much more common occurrence than a negative one, and a quantity of the Electric fluid is thrown into the human system, thereby exciting nervous action and producing violent Fevers. This may occur at all seasons of the year, and is perfectly independent of heat and malaria. When a stratum of air thus positively electrified has given out its Electric fluid for a series of years, it becomes, in its turn, negatively electrified, and instead of Fevers, Epidemic Cholera is produced. If the latter disease occurs successively for two years at the same place, the theory is doubtful, but this does not happen, and instead

of Cholera on the frontier, as an Epidemic next year, we may have fever, and even that in a slight degree while Cholera may visit Scinde and other countries to the S. West; for the Equilibrium of the atmosphere has been restored on the frontier, nay more, it has become positively electrified giving rise to fever which has been denominated an *Epidemic* about Loodianah and Ferozepore, and so it justly may be styled. The atmosphere at Subathoo has been thus positively electrified for the last seventeen years; in 1845, during August, and a portion of September, it became negatively electrified at least, the stratum nearest the earth, and Blue Epidemic Cholera was the consequence. The Equilibrium was restored during the latter month, Cholera ceased, and fever ensued.

The fevers then, which follow Epidemic Cholera, depend for their remote exciting cause on a positively electrified stratum of air which gives out an additional portion to the human body causing thereby an increased or excited action in the nervous system followed by ardent fever. Such a disease will prove fatal by effusion on the brain without the free use of the lancet. This removes the essential cause, and that it does so, is amply proved by a reference to the Table No. 2 in the appendix, where it will be seen, that out of upwards of ninety admissions during the months of September and October 1845 only two proved fatal. It is an easy matter to form theories and rules of practice founded on them, but in medicine both must stand the test of practice, and here with two exceptions both are proved to be correct. When we state that a certain mode of cure has been successful in only a certain number of cases, we must look on the statement with suspicion; for, a disease depending on the same essential cause ought to be removed in every instance by the means capable of removing that cause, provided no organic disease incompatible with life exists. In common Sporadic Cholera arising from congestion, some cases may undoubtedly prove fatal, not from the essential cause being unremoved, but from some organic disease, probably induced by the very existence of this cause. The same is true as regards Fevers.

In Cholera, therefore, whether Sporadic or Epidemic, we shall succeed in effecting a cure, if in the one, we remove the essential cause, and in the other, prevent its coming into action. Even in Blue Epidemic Cholera in

its confirmed stage, we could cure it, if we could only remove the essential cause, but this being beyond our present knowledge; it must be considered an incurable disease, except in those rare cases, where reaction is fully established by nature or art.

At Ferozpoore, Loodianah and Umballa, death took place after the Cholera from the Epidemic Fever. They were said to have died of Apoplexy, and so might the Cholera cases; but the disease was *true fever* set up by the state of the atmosphere, and marked by symptoms the reverse of Cholera, but terminating in the same way by effusion of blood or serum on the brain.

It has been supposed by some, nay, it is allowed by all medical men who have had much experience in Indian diseases, that fevers arise independent of Malaria. These are referred to the intermittent type including the Remittent and Bilious Remittent. That fevers do arise, and of a deadly nature from other causes than Malaria will now be evident, but it appears, that the pure intermittent and Remittent owe their origin to Malaria alone, and when they appear in individuals who have formerly suffered from either, the remote exciting cause is something that disorders the system and brings the original essential cause into action. We may, thus, see an individual in the midst of London with Ague and Fever on his return from India where he had formerly been afflicted with the same disease, but had not for a long time been exposed to Malaria. The locality of Subathoo furnishes little or no Malaria, and yet in 1842-43 and 44 Fevers of the Intermittent and Remittent type were common. A great number of the men had been afflicted with Intermittent and Remittent fever at Kurnaul, and any cause which disordered the system such as exposure to the sun's rays was sufficient to set up the type of fever under which they had formerly suffered. A well marked fever of the intermittent or remittent kind I have never met with, where the individual had not previously suffered from either, or was not exposed to Malaria. In saying this, however, it must not be concluded that the young men in the Regiment have been exempted from fever. Far from it. But their fevers were not intermittent or remittent, though usually returned as such, but an ardent fever caused by exposure, and the state of the atmosphere as regarded its Electrical condition.

In the cure of all fevers, the state of the nervous system must be kept in view, and even in the ardent fevers following the excitement of that system, a depression of the latter sooner or later takes place, and the Quinine is just as necessary in preventing a return of the symptoms as it is in Intermittent fever.

In the Exanthemata, where there is violent excitement of the nervous and arterial systems, a fever or a state of the nervous system occurs which requires tonics and stimulants. We see this exemplified in Small Pox and Scarlatina. In the latter disease on its first appearance, the cold or shower bath was found almost a specific, and we can easily see how it should be so in the stage of excitement; but, if employed later, it must necessarily kill, and so it has done frequently by destroying the tone of the nervous system, the energy of which had been lowered by the great nervous excitement. Again, in Small Pox, if we bleed before the eruption appears, the patient generally sinks from sheer irritation of the nervous system already weakened by previous excitement, and hence the great use of Opium in confluent Small Pox. I have, elsewhere, explained the treatment of this terrible disease; and others who have tried the sedative, soothing effects of large doses of Hill Opium in this fatal disorder, and to the extent which I have recommended can testify to the truth of my statements.*

I consider the fever which raged at Kurnaul in 1841-42-43 and 44 as a strictly Epidemic one, since the local causes of heat, Rain and Malaria with the much dreaded canal existed in 1830-31-32 and 33, and every attention to drainage, cutting down jungle, &c. would not have prevented the Epidemic, though these measures might have proved beneficial so far, as Malaria was concerned.

At Ferozpoore, the great mortality, as justly remarked by a Medical Officer of Her Majesty's service, was not from Cholera, but from Fever and Apoplexy. We see that the latter term may be applied equally to Cholera as to Fever, it is the immediate cause of death in both disorders; in the one it arises from the partial and severe re-

* Vide "Practical observations," Article "Small Pox."

action in the brain, in the other from the direct excitement of this important nervous centre. The situation of Ferozpore, and the nature of the soil give no grounds of suspicion, that Malaria is there an active Agent, and in ordinary years, the place is healthy. Such is, also, the case with Loodianah, and probably two places less subject to malarious fevers could not be selected; and yet in 1845, they were notorious for fever after the disappearance of the Blue Epidemic Cholera. The fever, thus prevalent at both places, was the true Epidemic fever which existed at Kurnaul for four years; and totally independent of Malaria, though the latter Agent no doubt came into action and produced Intermittent and Remittent fevers, I had an opportunity of witnessing the fine climate of Kurnaul in 1830 and 31, and also that of Loodianah in 1832-33-34-35 and 36, in all of which years, there was hardly any fever, but in one of the years alluded to, I think it was 1834, there prevailed a severe fever among the Native Troops. There was nothing particular about the hot and rainy seasons of that year, and yet in September, October and November a most violent fever occurred. It was a true Epidemic fever, and had European troops been stationed there, as in 1845, the existence of it would have been as well marked as in 1834.

A Committee has been formed for investigating the influence of the canal in producing fevers, and it is well known that the Kurnaul fever in 1841-42-43 and 44 was attributed by many in and out of the profession to its baneful effects. But it is not difficult to disprove this.

First, in the years alluded to, the fever was equally prevalent throughout the district lying between Kurnaul and Delhi in places where no canal existed as, in the vicinity of the latter. In the centre of Delhi, this fever raged among the natives with as great force as it could do on the banks of the canal as ably shewn in an annual return of that station for one of those years of which I had a perusal through the kindness of the Civil Surgeon.* Such reports are in the highest degree important, and to

* The report alluded to was intended for the Medical and Surgical Journal, where it would have met the public eye; but, will it be credited, that after being copied out for the press, its publication was prohibited, not by its author, however, and it now lies on the shelves of the Medical Board Office.

the members of the Canal Committee, they are absolutely required in order to come to a just conclusion regarding the influence of the Canal. Here, then, in the centre of one of the largest cities of the North West Provinces, we find a deadly fever occurring which could not arise from Malaria, nor from the Canal! The water is blamed, and various other causes are assigned. In 1843, the troops at Kurnaul were removed from the vicinity of the Canal. The 1st European Light Infantry had been sent away in 1842 and their lines deserted. Her Majesty's 3d Dragoons were located in the centre of cantonments, while the Horse Artillery remained, as usual, at the very furthest extremity of the lines from the Canal, and yet the prevalence of fever was even more marked than in 1841 and 42!

The best informed Medical men who have seen much of Indian Fevers have formed the opinion, that Remittent Fevers may arise from other causes than Malaria, because they have witnessed their occurrence in localities and at seasons when no source of this Agent could possibly exist. Nay, further, many of them can distinguish such Fevers from those arising purely from Malaria! The disease arising from such causes is *Fever*, and so is that depending on Malaria for its great remote exciting cause, but they are totally different Fevers. The one arises from excitement of the nervous system by the state of the atmosphere, the other from a cause producing depression of this system followed by congestion, and reaction, but both terminating by effusion within the skull.

Secondly, Previous to the opening of the canal at Kurnaul in 1819, I believe, Kurnaul was the healthiest station in the Upper Provinces! But so it was after this occurrence until 1824, when a fearful mortality occurred in a company of European Foot Artillery, 25 Europeans, I believe died from fever during that year. In 1825-26-27 and 28 the canal still existed, but the place was so notoriously healthy, that a funeral was a rare occurrence, and that of an Officer never witnessed! In 1829, the fever again made its appearance. The canal remained in *Statu quo*, the hot and rainy seasons presented nothing unusual, but still, half the troop of European Horse Artillery was in Hospital in September, and many deaths occurred. It was the Epidemic fever of 1824-1841-42-43 and 44 depending on the state of the atmos-

phere, and had the cantonment of Kurnaul been terraced, and every particle of vegetation removed; the canal turned off long before it reached Kurnaul, still the Epidemic would have occurred

It cannot be denied, that the vicinity of a jungle, such as exists at Kurnaul must give rise to Malaria, but this cause has always existed, and yet Kurnaul for upwards of 30 years preserved its healthy character and in 1840, the place was unusually healthy! Neither the canal, the jungle, the heat, nor rains will account for the fever of Kurnaul, and they are just as incapable of accounting for the fever which has prevailed as an Epidemic at Loodianah in 1845. As well might we say, that the Blue Epidemic Cholera of the same season owed its origin to such causes! In every country in the world, some great atmospherical cause must give rise to the Epidemic witnessed. No local cause existed in Paris, St. Petersburg, London, Edinburgh in 1831 and 32 when the Blue Epidemic Cholera visited them, that did not exist in previous years, and yet some great atmospherical change occurred producing a fearful disease never before witnessed, at least, to any extent, and which was supposed indigenous to the warm latitudes of the East. Plague had never been seen in India, and yet it appeared in Rajpootana at Palee and other places. It was called by some a form of remittent fever, but it was no such thing, and my worthy and esteemed friend Maclean was perfectly right in his diagnosis, tho', the Secretary of the Medical Board sitting in his office in Calcutta might endeavour to support old antiquated notions regarding the improbability of plague in India! The same was tried regarding Blue, Epidemic Cholera when it appeared in England, but this disease carried the proofs of its existence along with it, and could not long be mistaken.

The fevers, then, of a purely intermittent type, whether occurring at Kurnaul, Umballah, Loodianah, Ferozepore, Subathoo or Kussowlee, must depend on Malaria, or the individuals affected by them must have formerly been exposed to this agent. The fevers arising at seasons when no Malaria is generated, or, in localities where it cannot be produced, are of an Epidemic kind, depending like Cholera in its Epidemic form, on a peculiar state of the atmosphere. Malaria is the true and only source of

Intermittent fever including the Remittent and Bilious Remittent. The violent fever which ravaged the troops at Kurnaul in 1821-1829-1841-42-43 and 44 did not depend on Malaria, but was a true Epidemic fever owing, as its great remote exciting cause, a peculiar state of the atmosphere ; and the same is true of the fever of 1845 as witnessed at Ferozepore, Loodianah, Umballah, and Subathoo. That many of the cases at all these places and at Kurnaul in the years alluded to arose at the breaking-up of the rains from Malaria cannot be doubted, and their Intermittent and Remittent type was well marked. It is not to be supposed that the Members of the Profession are always the best judges in these matters, and I well recollect the smile on a worthy general officer's face, when I attributed the fevers at Subathoo to Malaria ; " where is it my good Sir," were the expressions of this officer, and " where is it" echo may reply !

Even Typhus fever, which has been denied an existence in hot and tropical climates, may be witnessed in the latter, and among the men of H. M.'s 9th and 1st Eur. Lt. Infy. in 1842 at Subathoo and in those of H. M.'s 62d at Ferozepore in 1843, there is strong reason to believe that many of the cases assumed the Typhoid Type.

There appears to be no strictly indigenous Epidemic. The Cholera, tho' occurring generally in the East, may visit Europe. The plague, too, existing about the Mediterranean, may extend its course to Rajpootana ; the typhus fever, indigenous to cold and temperate climes, may appear in India, and the yellow fever of the West Indies is seen in the Eastern Islands. The Exanthemata prevail in India as well as in Europe. All these depend on a peculiar state of the atmosphere independent of local causes when thus traversing the earth from one quarter to another.

It may appear strange to us, and we are inclined to deny such occurrences, but the fact cannot be denied

The subject of fevers is equally important as that of Epidemic Cholera, and I trust the foregoing remarks will serve to explain some points connected with them, not as yet well understood. I only wish that the Medical Officers in charge of Eu-

ropean troops on the frontier would give eases. But the unwillingness of the higher authorities to let the public see the returns of disease is a serious drawback in the Company's service. Even, a Superintending Surgeon is afraid to furnish a return, as the Medical Board may call him to account, and thus no progress is made in our knowledge as regards Medical affairs! In Her Majesty's service, it is different. All the accumulated knowledge is made subservient to improvement, and an analysis is published of the records in every quarter of the Globe; and I must here confess my obligations to the Head of the Royal Medical service, for his willingness to furnish me with any returns I may require. This contrasts, agreeably with the heads of the Company's Medical service, who will not even allow an annual report to see the light! It is placed on the shelves of the Medical Board's Office and is a *Caput Mortuum*! Why this desire to retrograde should exist in India, it is difficult to account for. That it should exist is a slur on our superiors, and I think it only requires to be brought to the notice of a liberal Government, in order, to be removed. The vast amount of knowledge to be gleaned from the records of the Medical Board should be made available to the Medical service in India, and some competent persons selected for extracting the essence. Surely the Medical servants of the Honorable Company's service are as capable as those of the Queen's for effecting such a purpose, at least, the experiment of testing them is worth trial. The whole returns of Cholera, Fever, Dysentery, Hepatic complaints should be thrown open to the service, we are working in the dark, and the experience of former years might save us a great deal of trouble.

The appointment of a committee to inquire into the influence of the canal in causing disease may be hailed as a good omen, and if a committee were ordered to examine the records of the Medical Boards and publish the result, a vast fund of information would be thereby gleaned as regards the mortality of disease throughout India, for, the investigation should not be confined to Bengal, but be extended to the Sister Presidencies of Madras and Bombay. I am convinced, had Lord Ellenborough remained at the head of the Government, that the measure here recommended would have been carried into effect, and it is to be hoped, that his able successor will be enabled to

bestow a thought on a subject of such vital importance to the Medical service in India.

CHAPTER IX.

Concluding Remarks.

As the pathology of Blue Epidemic Cholera is a subject of the deepest interest, I may again make a few observations on that point, and explain more fully than I have, hitherto done, the beautiful manner in which cause and effect are exhibited in this fatal disease.

Two questions may be asked regarding the matter.

First—Suppose all the Arterial blood in the body were dead, except that supplied to the brain, what would be the effects on the human system?

Secondly.—How long could the brain and other nervous centres preserve life without a renewal of Arterial blood?

In answer to the first, let us see what the use of Arterial blood is. What does it do? Does it occupy a conspicuous place in the body? The Arterial blood is the fluid from which all the rest of the tissues and organs of the body are formed! It is the fluid to which the vital act is communicated in the embryo whether of viviparous, or oviparous animals! It is generated by a vital act, and is itself a vital fluid! From it is formed the heart which contains it and the Arteries through which it circulates itself to the remotest part of the body and into the most minute structure of the various portions! Look at the brain! we can, with the naked eye, discern two structures, a gray, cortical, external portion; and a white, medullary, internal one; in the Cerebellum, we can see these two portions intermixing and radii from the one passing into the substance of the other like branches of a tree and

named from this resemblance and very aptly, the “Arbor Vitæ,” or, tree of life. If we apply the microscope to the brain, this gray portion is found to be composed of an innumerable mass of capillary Arteries imbedded in Albumen and filled with living Arterial Blood, which actually terminate in loops according to Valentine for the purpose of seizing the white portion of the brain. Dr. Stark, however, in his admirable paper on the nervous centres, is satisfied, that these loops do not exist, but supports the views of other microscopists regarding the structure of the gray portion of the brain, and further states that these capillary Arteries embrace or lay in contact with the white portion, and enter deeply by indentations as beautifully exhibited in the cerebellum. Here then, there is what may be called a *Jet d'eau* of living Arterial blood in the brain acting constantly on the white portion which has been itself discovered to consist of innumerable, cylindrical tubes filled with animal oil and similar in structure to the nerves throughout the body. The blood contained in this wonderful net work of Capillary Arteries is supplied by a large one named the Basilar, which is formed by the two vertebral Arteries. These are given off from the Subclavian which take their origin from the Aorta the great arterial trunk of the system. These vertebral Arteries are not like others imbedded during their course in soft parts, where they would be liable to unequal pressure from any change in such parts, but enter bony canals in the solid bone composing the vertebræ, from thence they proceed through foramina or holes in the skull until they reach its base, where they unite to form the great Artery, or King of Arteries named, in consequence, the *Basilar* which, as every school boy knows, is derived from *Basilens-eos* a King! This Kingly or Royal Artery must have impressed the earlier anatomists with its great and important functions; others are named according to their situations, such as the femoral, brachial, radial, ulnar and the like; here is an arterial trunk formed of two Arteries which also derive local names from the vertebræ through which they pass, receiving its name from its function, it is the *Basilar* Artery, the King of Arteries! This Artery may be compared to the watering pot of a gardener and its distribution in the gray matter of the brain, to the jet which pours out of innumerable holes in the rose of the said pot significantly termed by the Natives of India “*Huzara*” or thousands!

This supply of living Arterial blood from a thousand Capillaries or more correctly from thousands is not like that from a watering pot in the hand of a gardener and made at his will, but a constant, never ceasing supply under the guidance of a vital Agent, and totally beyond the power and influence of our wills. It is of much too important a nature to be entrusted to us, it has to produce a vital or involuntary action in the brain. If the vertebral Arteries be tied in animals, death is as instantaneous as if they had suffered decapitation. If only one be tied, the functions of the brain are greatly disordered. So that the arterial blood conveyed by the vertebral Arteries is, essentially, necessary to the very existence of life, and when this supply is stopped, life cannot exist. But suppose, that by some extraordinary means this arterial blood which passes from the heart to the Aorta, from thence to the Subclavian Artery and through the vertebral Arteries to the Basilar were increased in quantity by the Capillary Arteries of the brain becoming more distended, or, new ones filled, what then would be the consequence? Why, that the nerves issuing from the brain would be inordinately excited, and the organs supplied by them brought into a state of unusual action.

The structure of the spinal chord and ganglia is similar to that of the brain according to the late investigations of Stark, and we will suppose, that the capillaries of their gray structure are also supplied by more arterial blood than usual. A similar effect would then be produced on the spinal nerves, and the nervous ganglia as evinced by these proceeding from the brain. Or supposing that the change of action in the brain is capable of being communicated to the chord and ganglia, the matter will be simplified. Is there then any diseased action by which this rush of arterial blood takes place? Yes! in Blue, Epidemic Cholera it occurs, and what is the consequence? Do the muscles remain quiet, and subject to the will? Does the stomach continue to digest its food and evince no disorder? Are the bowels subject to the regular peristaltic motion, whereby the chyle is taken up in their lacteals and the fœces voided? Does the respiration remain unaffected? Do the various secretions go on as usual? No! the muscles are thrown into violent action termed spasms or cramps; they act independent of our will, and no effort of the latter can restrain them. The stomach, instead of remaining quiet, puts on a diseased

action, whereby constant vomiting, or efforts at that action, are produced ! The bowels, instead of performing their usual functions, cease to absorb chyle, or void fœces ; but they are thrown into violent action, and throw out a fluid resembling strongly *rice water*. The breathing is oppressed, and no secretion takes place !

These are some of the well known symptoms of Blue Epidemic Cholera, and may occur in Common Cholera. There is, then in this terrible disease, an increased volume of living, arterial blood sent to the brain on the Invasion of Cholera, and there it remains until death takes place, or until a reaction occurs, whereby the circulation is restored, and this vital blood communicating the same property to the rest, the disease is removed. But, in Blue Epidemic Cholera, there is another symptom present which this violent action of the nervous centres will not explain. *A blue skin !* whence does it originate ? After, the increased flow of arterial blood to the brain, the whole blood in the other parts of the body loses its vitality. The skin becomes blue, there is no heat of surface the blood does not circulate through the arteries or veins ! Neither they nor the heart itself can circulate dead blood ; the latter, when alive, can circulate itself by its own vitality through both arteries and veins, though in a diminished degree through the latter ; for, after supplying the secretions and the waste of tissue, the arterial blood loses a portion of its vitality, it becomes of a darker colour, will not flow in a jet from a vein as it does from an artery, may be stopped in the former by mere pressure, but will not be imprisoned in the arteries after they are opened, unless actually tied. The absence, then, of living arterial blood in Cholera gives rise to the blue skin, it is the index of dead blood ; this fluid loses a portion of its vitality in circulating through the system where it becomes venous blood, but in blue Cholera, it loses its vitality altogether, and will not flow, neither does it impart any heat. In a state of health, the heart beats, the pulse is felt, the skin is warm, the secretions are performed, there is no blue skin, no spasms, no vomiting, no purging, the breath is warm, so is the tongue, the muscles of voluntary motion obey the will ; here the brain performs its natural functions, the Arterial blood after supplying it and the rest of the body is returned by the veins to the heart, passes from it to the lungs, where it regains its lost vitality by the action of the latter, re-

turns to the left side of the heart and circulates from thence to all parts of the body imparting warmth to the surface, producing all the secretions and supplying the loss of tissues, all vital actions and performed by a vital fluid. In Blue Cholera, none of these actions occur, the body is a living corpse, and life alone exists in the brain, at least, animal or functional life, for, there is still organic life in the muscles, but, even this ceases after a time. Amidst all this commotion in the system, does the mind suffer? If it depended on the brain, it is likely that it would be disturbed like other vital functions! But, no! amidst this terrible convulsion caused by the rush of blood to the head, it remains quiet and undisturbed! It cannot, then, be a vital action, since it is neither affected by the state of the blood or nervous centres, no! it is not a vital function! It is immaterial, and unlike these, it is not regulated by either nerves, or Arteries! It is, as justly supposed by Abernethy, a something superadded to vitality and organic structure a *tertium quid*, which can live without matter, though its existence can only be manifested during the vitality of the latter; when this ceases, the mind or soul departs with the vital spark of life. Have the Brutes no mind or soul? No! all their actions are the effect of *vitality and organization* of a nervous, sanguiferous, muscular, secreting, bony structure differing in no way from our own, except in form and modification. They have the same passions as ourselves, but guided by mere instinct and the sagacity of the Elephant and the cunning of the monkey tribe guided by this principle alone, bring these creatures to the near level of some of the human race! Still, they want the attributes of the mind, the intellectual powers which distinguish man guided by reason and conscience. In Blue Cholera, the mind remains unimpaired. But the materialists will say, what do you call delirium? Is the mind affected there? No! the functions of the brain are, and passion, such as grief, jealousy, fear, rage may be evinced, the mind remains unimpaired, but for the time inactive! An animal might exhibit all these symptoms and give vent to his feelings, if he could speak; and how often do we see after the continuance of fever attended with delirium for days and nights that a few minutes previous to death, the mind regains its influence amidst the wreck of matter!

I have often been asked, have you not seen many men

die? Yes, a great number! Have you seen any of these soldiers expressing a dread of death, and after consequences? Seldom or ever! Well, then, it must be nothing more than the decay of matter that causes the mind to cease, it is material and dies with matter.

Alas! This is plausible, and many rest satisfied with it, for no other reason, than that Hume, Voltaire and other great men were likewise satisfied. Though such men may have been great Philosophers, lovers of wisdom in the worldly sense of the word, yet they were not Physiologists, and Pathologists like Abernethy, Hunter, Haller and many others who might be named. They forget, that it is our passions and the acts committed under their influence that renders us amenable to punishment here, and hereafter. The Brutes who have no mind, but possess passions as strong, or even stronger than our own, express vividly their horror of annihilation, or, which is the same thing with them, death! The smallest insect will endeavour to escape the hold and avoid destruction! But man, when prostrated by disease, has no such horror as soon as the material system common to him and Brutes is destroyed. It is only during the vigour of it, when all his animal faculties are in perfection or little impaired, that he, like the rest of the animal creation, has a dread of death. This is an inherent principle in living creatures, and according to the degree of health and strength enjoyed by them, so is there reluctance at parting with it. When the powers of life or vitality are diminished, man becomes more and more reconciled to death, and this effect can hardly be conceived by the young and healthy who have never been stretched on a bed of sickness. But let those who have been at the brink of the grave and who afterwards recover, confess the truth and they will confirm my statement. What have they to dread under such circumstances? The punishment awarded to an ill spent life? True, but does it not follow, that rational man laying for weeks on the bed of sickness, where no unruly passion carries him to the commission of fresh crimes, and his intercourse cut off with the world, must become alike callous to all the allurements, cares and difficulties of the latter, must enjoy a quietness of mind incompatible with the same individual in a state of rude health, the slave of his passions like the brute, and mixing in all that concerns the world and society. The former is the situation of the poor soldier who has been prostrated by disease. His

mind is at rest, he bears ill will to none, forgives his enemies, if he has any, takes leave of the world, and if he be a Christian, relies firmly on the merits of a Redeemer. Is such a person a proof that mind or soul is matter resting for its existence on the latter? No! But such is an undeniable proof that the mind is immaterial, immortal and quiet in its own consciousness of not offending the laws of its Creator, and in the firm hope of having forgiveness for former sins and transgressions, it quietly awaits the termination which severs life and matter by which the mental powers and energies had been manifested, but whose existence is alike independent of both.

That an increased volume of arterial blood is sent to the brain in Blue, *Epidemic* cholera cannot, for an instant, be doubted. The individual is sensible of it during life and vividly describes it as a ringing in his ears, a noise or even a rushing of water, and after death, there it is to be seen in the brain.

Since such great care is taken, that no undue portion of blood be sent, and the proper quantity preserved as evinced in the course of the vertebral arteries, it must follow, when this rush of blood occurs, that a disease of a fearful nature must ensue, provided it is not again carried off by the veins and sinuses. I have endeavoured to shew, that this cannot take place from the congested state of the veins, and the loss of vitality in the blood. I have, also, shown, that in *Common* Cholera, where every symptom is present save the latter as evinced by the blue skin, if we can remove the congestion by powerful medicines, the brain is relieved, the pulse returns, the skin regains its heat and the secretions are restored. So that it is clear, that this loss of vitality in the blood is the true and essential cause of *Blue Epidemic* cholera, and that congestion alone following on nervous depression may account for all the symptoms of *Common* or *Sporadic* Cholera. I have not had occasion to examine the body of an individual dying of this complaint, but others have, and the congestion in the brain and other organs is well established.

In *Common* Cholera, at the commencement, there must be some increase of arterial blood to the brain in order to set up the symptoms which indicate its approach and in several instances, the patients have described a ringing noise in their ears with deafness and dulness of vision,

all of which has disappeared when full reaction took place by the repeated action of the stomach.

In what respect then does apoplexy differ from Cholera? There is a rush of blood in both instances. So far they agree as to this point, and apoplexy is still nearer allied to the violent fever following Cholera, as to the remote exciting cause of both.

Exposure to the direct rays of the sun may cause apoplexy, but it will not give rise to Blue Epidemic Cholera. If the heat be less intense, it may occasion violent fever. The force of the arterial circulation is greatest in apoplexy, the vessels give way, and blood is effused within the skull, and which by its pressure, either kills or renders the body paralytic, and there is no febrile symptom established. In order to produce the latter, the action of the arterial system must be less intense than when they arise from the state of the atmosphere depending on Caloric or Electricity, and when such increased arterial action manifests itself in common remittent fever, it is the effect of previous depression of the nervous system causing congestion in the venous circulation, to overcome which the increased action in the arteries takes place, constituting what is termed an exacerbation in remittent fever, and when it partially succeeds, a remission is the consequence. The same reaction marks the hot stage of pure intermittent, and when the congestion is entirely removed, as it generally is, in this fever, all febrile symptoms subside and the skin is bathed in perspiration. This then is the great difference between intermittent and remittent fever, whose remote exciting cause is malaria, and those fevers of an epidemic character which are caused by some powerfully exciting cause which acts at once, without any previous depression of the nervous system or congestion, and consequently, any well marked cold stage or rigors. The arterial action, though less in such fevers than in apoplexy is still sufficient to cause death, not generally by the rupture of vessels and effusion of blood, but by the effusion of the serum of the blood into the ventricles and occasionally by that of blood into the base of the brain. The primary steps are slow in Blue Cholera; but, when the rush of blood does take place, it is fearfully rapid, yet life is not, at once, extinguished, but the symptoms of this disease are set up as so often described. In Phrenitis, whether Meumgitis or, Ce-

phalitis both combined, great excitement is produced, and the arterial action in the brain and its membranes is increased and capillary vessels are filled which were not previously perceived by the naked eye; inflammation, in short, is set up, forming this well known disease which differs only from apoplexy in the absence of rupture of the vessels, and the same remote exciting cause modified or increased may give rise to fever of an Epidemic character as well as to apoplexy and Phrenitis. As already alluded to, fever and apoplexy are said to be the fatal diseases succeeding Blue Epidemic Cholera. But both may exist without being necessarily preceded by this disease, provided the state of the atmosphere capable of setting up the direct excitement of the arteries of the brain and its membranes be present.

The answer to the first question proposed is then, simply, that, when the brain is supplied with living arterial blood, while, this blood is dead in all other parts of the body, the vital actions will be carried on; but without performing their functions they lose their animal life, and merely retain their organic existence. The heart beats, the lungs respire, the stomach and bowels act, but neither digestion, assimilation, absorption nor the peristaltic motion takes place. No secretion is performed. The heat of surface is lost, the pulse disappears, no arterialization takes place, the body becomes a living corpse, and when real death occurs, little or no change is observed as was remarked by Majendie. The blue, cold clammy skin is the same, the shrivelled bent fingers, the half shut, sunken eyes, cold tongue remain just the same after death as when the spark of life existed; it was not life, but the half of life or organic life! The distinction of Bichat is, here, distinctly shown, and the point is proved that organic life may continue in Blue Epidemic Cholera for hours after the animal or functional life has ceased.

The second question may, now, be discussed How long could the brain and the nervous centres preserve life without a renewal of Arterial blood?

It is evident from the Pathology of Blue Epidemic Cholera, that the original Arterial blood sent to the brain performs the functions of vital blood without renewal, for it cannot be carried away, and if it were, there is no fresh Arterial blood in the body to supply its place. This

living arterial blood can only act on the great nervous centres, and in this way, we say, that at first it sets up a chain of diseased action in both the voluntary and involuntary Organs. Those which depend on the nervous action of the brain are thrown into inordinate excitement, such as the muscles, stomach and bowels, whilst the action of the heart, instead, of being increased so as to cause a corresponding change in the Arterial System, is unable to circulate the blood, or, rather, the blood cannot circulate itself, having lost the power by which it does so, namely, its vitality.

If the blood be a vital fluid, then, those vital actions which depend on that power must cease when its vitality is lost. In the state of Collapse from Blue Epidemic Cholera, and where no living blood exists, save in the brain, no vital actions can remain except in so far as they depend on its action. The circulation of the blood is a vital action, so is secretion, also digestion and absorption, the peristaltic motion of the bowels and the arterialization of the blood in the lungs. The heart beats, inspiration and expiration take place, there are vomiting, looseness and congee diarrhœa, but these depend on the nervous action of the brain sustained by the living blood in it ; sensation remains, and if a powerful stimulant be applied, such as a blister, the pain is complained of, volition continues, and the members of the body can be moved at will, the person can turn, hold out his hand, and the speak, though in a low tone of voice scarcely audible. These are the acts depending on the action of the brain and nervous centres ; but, even these cannot exist long. The heart's beat becomes feebler and feebler, the inspirations fewer and fewer, the voice is barely audible, and at length, the heart ceases, the last expiration is made, there is no motion, no sensation, no act of volition, complete death has taken place ; the functions depending on the vitality of the blood had long ceased, except in the brain, and its functions at length die both animal and organic. If no reaction occurs, the supply of living arterial blood in the brain may preserve organic life in the system for a space of time varying from 4 to 12 hours. If a partial reaction occurs, and if this be moderated, the individual may survive for 12 hours longer, and in the case of women, they may linger for even a few days by means of this partial reaction. All symptoms of the disease may have disap-

peared except the four permanent ones ; but still the case is hopeless, unless the reaction become general ; so long as the blue skin exists, no pulsation, no secretion and the cold clammy skin, the fatal disease retains a firm hold of its victim, and the absence of vomiting, purging and cramps is no criterion by which we can form a judgment ; they depend on muscular action which has now ceased, in consequence of the irritability being exhausted, and when this muscular irritability is small, as in weakly people, and women, hardly any spasms vomiting or purging may occur, but the case is just as hopeless as if they were all well marked, and though more lingering, the result is the same, *death*.

If we examine ancient records, we shall find that the Epidemic Cholera is a disease which has been prevalent in India, since the time, when Europeans first visited the country ; and in the accounts given by Portuguese Authors, it is described as one peculiarly marked by its slight beginnings and fatal termination. It has, most likely, been named a Plague when devastating large tracts of country in the East, and even in 1845, such was its designation in Affghanistan. Were it not that Europeans now possess India, and become acquainted with every passing event, and of which a record is kept, we should look in vain for any account of the Epidemic Cholera of 1845 fifty years hence. The impressions of such events are speedily effaced from the minds of the Natives, particularly the Mussulmans, who concern themselves but little regarding the causes of great mortality ; the individual has died, it was the will of God, and there the matter rests. And yet we can hardly believe, that the thousands who have perished by Epidemic Cholera in 1845 could be so easily forgotten, but so it is, man is the creature of circumstances, he is excited and alarmed when a fearful Epidemic rages, or a destructive war occurs, sweeping off thousands of his fellow creatures, but when these causes cease, he is perfectly unconcerned, and in a short time almost forgets the occurrences !

Look at the alarm which existed in August last 1845 regarding Cholera, but this in a few short months has as completely subsided, as if Cholera had never existed, and many will, perhaps, never get through even this short treatise ! “ It is an old affair, and what do we care for

Blue Cholera ! It has passed, and may not occur again in our times," and it is to be hoped that it will not. At the same time it must not be forgotten, that the disease did exist in 1817 or eight and twenty years ago in the Marquis of Hastings's Camp in Bundlekund, and in a less marked degree, it has visited several stations in the Upper Provinces since that time, and even Subathoo itself sixteen or seventeen years ago. It is a thing that has happened, may again happen, nay, must occur sooner or later, and it is to be hoped, that the remarks embodied in this work, though of a very imperfect nature, will serve to throw some light on a disease, justly termed a "mysterious one," and enable us or our successors to combat it in the '*stage of Invasion*,' where we can alone look for a successful result.

From the view taken of Epidemic Cholera in this treatise, it will appear plain, that I do not consider the disease contagious, that is, capable of being conveyed from one person labouring under it to another in health supposing that both were removed from the range of the exciting cause.

If it were of such a nature, how did it happen that the sipahees of the Nusseeree Battalion on guard over the Subathoo treasury were not affected ? Merely because they were not within the range of the great remote exciting cause. It is like the fever which has appeared at Loodianah in 1845, and that of 1824-29-41-42-43 and 44 at Kurnaul, a strictly Epidemic disease, and no more contagious than such fevers are, and which nobody ever suspects of being so ; the only difference is, that in Cholera, almost any disturbance in the system will give rise to it, when it is prevalent, but as regards Fever, the predisposing cause may be better marked, though even this is somewhat doubtful as witnessed in H. M.'s 3d Buffs at Kurnaul in 1841, where almost every man in the Regiment was at one time or other, affected. The atmospherical change giving rise to Cholera is of a more evanescent nature ; it occurs but seldom, and often at long intervals of years and is happily soon removed ; but the remote exciting cause of these fevers, or in other words the atmospherical change which acts as such, occurs year after year, differing in degree and causing changes and modifications in the disease produced. The Great Sydenham

was well aware of this, and very justly gives the *Epidemic constitution* of one year as compared with another. The Epidemic constitution of the year 1845 during June, July, August and a portion of September, was marked by cholera. The greater portion of September, October and November by fever. Again in 1841, 42-43 and 44. The Epidemic constitution of the years was febrile, and so it is with each succeeding year ; and it would be a useful employment for any Medical man to draw up the Epidemic constitution of past years, and this he could do in some measure by a reference to returns, though, in order to do it effectually, he must, like Sydenham, be an observer of the prevailing diseases. We see even, at the present day, in England, that the memory of this great man is revived, and a Society or Institution formed bearing his name. His works bear the stamp of truth, they are founded on actual observation and successful practice based on them; they have stood the test of experience, the only true one in medicine ; and they will, therefore, retain their value as long as medicine is practiced and their author will not be forgotten like hundreds of others who, instead of observing facts without any preconceived theory, have first formed the latter, and made facts subservient to it, so far as to satisfy themselves, and which could not be made so pliant by others. The consequence has been, that both the author and his theories have been forgotten ! Thus it has been, and ever will be in medicine ! Let the Physician, then, carefully study facts at the bedside of his patient ; observe symptoms, trace them to their essential cause, and remove the latter without the vain endeavour of combating the former. What use is it applying friction, turpentine and the like for Blue Epidemic Cholera ? They are merely temporary symptoms ; or of giving sedatives, astringents to check vomiting and purging, also temporary symptoms. But, let us try to *bring back the pulse and secretions* or, *remove the blue, cold, clammy skin* and we fail ! These are permanent symptoms depending on the action of an essential cause which latter must be removed, and if this is accomplished, all the symptoms temporary and permanent cease to exist ! This is the true practice of physic, to prevent the essential cause from being formed, or, to remove it ; the latter object we can effect in many disorders, but, in Blue Epidemic Cholera we cannot by any means at present known, and therefore, we must prevent its coming into

action and to point out the manner in which this is done has been the object of this treatise; how far I have been successful in imparting my views, remains to be seen, but I can honestly assure my readers, that had I not been impressed with the firm conviction of the truth of what I have advanced, I would never have dared to give my views to the medical profession and the public.

1st.—I have, I trust, proved, that the blood is a vital fluid; for, we see in Blue Epidemic Cholera, that when it loses its vitality, all vital actions cease.

2dly.—That notwithstanding the cessation of the vital actions, that of the brain remains from the portion of blood sent to it, retaining its vitality.

3dly.—That the circulation of the blood both in the arteries and veins depends entirely on the vitality of the blood, and when the latter principle is destroyed, that the heart may beat, but no blood flows from it or to it. The whole is a stagnant mass; the expression, then, of the heart, arteries and veins circulating the blood is not strictly true, it ought to be, the vital blood circulates through these by means of its own inherent vitality, and the mooted question of the contractility or the reverse of the arteries may be set at rest.

The blood of the arteries is full of vitality, and requires strong tubes to contain it, such as the arteries are. That, in the veins, though still alive, has lost a great portion of vitality in supplying the secretions and tissues, and only requires the venous tubes to contain it; if it escape from the former, and the artery be a large one, death speedily follows; all animal and organic life is at once destroyed; if the artery be small, it must be tied, or pressed firmly against a bone, the blood here is like a strong animal in the full vigour of health, and must be bound before we can bring him into subjection, while the venous blood may be represented by a weak, sickly individual, who can be held fast by the slightest means! In the blood, then, is the life so beautifully expressed in Scripture. “But flesh with the life thereof, which is the *blood* thereof, shall you not eat.” Genesis ch. X. verse 4th.

4thly.—Tho' the blood can circulate itself from the heart, even when an animal is decapitated, thus showing the power and independence of this vital fluid, yet the heart's muscular irritability enables it to beat by means of the Brain after the vitality of the blood in itself is gone, and so of the lungs, Stomach, Absorbents, Intestines ; the organic life in one and all is kept up for a few hours by means of the Brain acted on by living blood.

5thly.—That when the Brain is suddenly excited by a flow of Arterial blood to it, which cannot escape, the temporary symptoms of Blue Epidemic Cholera occur, vomiting, purging, cramps, thirst without any increase in the circulation, but quite the reverse, since the force of the latter depends solely on the degree of vitality in the blood, and when that is lost, no pulse is felt, no blood will flow either in artery or vein.

Lastly.—Though mind and matter are intimately connected in the human body, we see that the former can exist when animal life has ceased in all parts of the body, except the brain, and that it does so unimpaired, until the decay and cessation of organic life in the brain itself render its presence no longer discernible, and it takes its flight, immaterial and immortal ! It is like a mechanic who cannot exhibit his art without tools ; the brain is the workshop, and so long as it is supplied, he goes on, and produces his mechanism, but when the tools are worn out and destroyed, he can no longer work ; but as well might we say, that the mechanic, or artist, depended on his tools and instruments for his knowledge and existence as to say, that the mind owed one or both to the matter of the brain.

In Brutes, the brain or workshop is there, but the artist is absent, no action of mind is produced ! An inferior takes his place named instinct, who instead of producing the beautiful workings of the mind can only effect passions and desires all with which the brute is endowed.

We know nothing of the soul or mind, except by its powers as evinced when attached to living organic matter, so in a complicated piece of mechanism, we see it perform actions which no man imagines that it could do without having passed through the hands of its maker. If we, therefore, allow this of mortal contrivances, how can

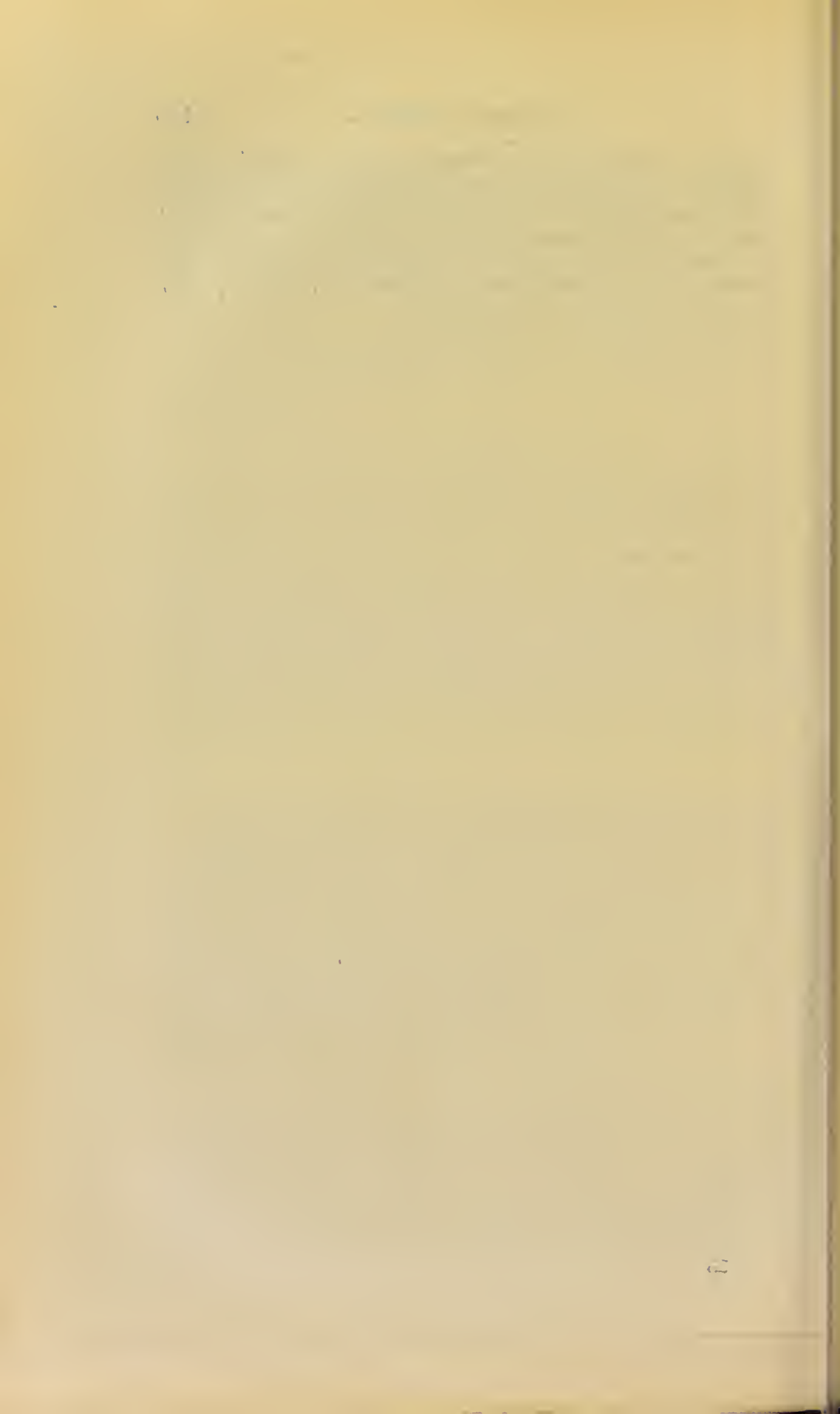
we suppose for an instant, that matter could, without a directing power, exhibit the wonderful and incomprehensible workings of the mind ? It is a Divine Essence which never dies, and only ceases to exhibit itself when our mortal bodies die. Were these of a kind which knew no decay or death, then the soul would be everlasting in them and Divine Revelation assures us, that the soul, mind or spirit which is attached to our frail bodies for a certain number of years of probation on earth, will, in a future state, be united with such a body, immortal, incorruptible !

This is the hope of all Christians, and were it not for this, the cares, anxieties, troubles, vexations, diseases and sufferings of our present frail bodies would often be insufferable, but they are all for a wise end ; and though the materialist cannot well imagine anything independent of matter, his mental powers are like those of other mortals, and the subject is beyond his reach. He knows as little about the matter as the most uneducated Christian who believes implicitly the Holy Doctrines of the Bible without troubling himself to prove the existence of what he takes for granted ! Are his intellectual powers greater than those of a Newton, a Haller, a Good or an Abercromby ?

It has been said, that an Astronomer must be mad who does not believe in a God, and equally mad must be a Physician who has studied the human body in a state of health and disease as connected with Anatomy, Physiology and Pathology and remains incredulous. It does not follow, when a man learns these branches of science, and sees the wonderful operations of the system, many of which he is able to explain, that the subject is less wonderful ; the more he learns, the more humble ought he to be, and the man who learns the most will have most reason to exclaim, "wonderful are all thy works Jehovah" !

Look at Linceus, a man, perhaps, better acquainted with the structure of the mineral, vegetable and animal kingdoms than any who has ever lived ; look at his sublime invocation to the Deity as the Author of all, in his *Systema Naturæ*. Observe others who, in their investigation of nature, have been so struck with the worthlessness of every pursuit, save that of the worship of the

Creator, that they have renounced all their investigations, perfectly satisfied that they had already acquired the only knowledge that was worth searching for, namely, the undoubted truth, that an Omnipotent, Omniscient and Omnipresent Being existed who created all, knew all and preserved all, without whose Divine fiat, nothing was made, could exist, or cease to live.



APPENDIX,

C O N T A I N I N G

THE

RETURNS OF BLUE EPIDEMIC,

FROM THE

S T A T I O N S

IN THE

NORTH WEST FRONTIER,

B U K K U R I N S C I N D E .



TABLE No. I.

Exhibiting the number of Admissions, Cures and Deaths from Blue Epidemic Cholera, during the Months of May, June, July, August, September, and October 1845, among the European Troops at the Station of Umballa.

YEAR 1845.	H. ARTILLERY AVERAGE STRENGTH 326½	F. ARTILLERY DO. 203.			H. M.'s 3 ^d DRAGOONS STRENGTH 610.			H. M.'s 31 st FOOT STRENGTH 1128.			GENERAL ABSTRACT.			
		Admitted.	Discharged.	Died.	Admitted.	Discharged.	Died.	Admitted.	Discharged.	Died.	Troops.	Admitted.	Discharged.	Died.
May,..	1	1	0	0	4	2	0	1	1	0	Horse Artillery, ...	29	7	22
June,..	0	0	0	1	0	2	0	1	1	0	Foot Artillery, ...	28	12	16
July, ...	6	0	5	1	2	2	0	39	6	18	3d Dragoons, ...	100	53	44
August,.. ..	21	5	16	10	87	22	40	170	83	94	31st Foot, ...	235	108	124
September,..	1	1	1	4	6	22	4	24	17	12				
October,....	0	0	0	3	1	3	0	0	0	0				
Total,..	29	7	22	12	100	53	44	235	108	124	Grand Total, ...	392	180	206

TABLE No. II.

Exhibiting the number of Admissions, Cures and Deaths from Blue Epidemic Cholera, during the Months of May, June, July, August, September, and October 1845, among the European Troops at Loodianah, Ferozepore, Kussowlee, Subathoo and Sukkur.

YEAR 1845.	LOODIANAH.	FEROZEPORE.	KUSSOWLEE.	SUBATHOO.	SUKKUR.	GENERAL ABSTRACT.							
	H. M.'s 50TH A. S. 915 H. ARTILLERY.	H. M.'s 62D. A. S. 879 H. AND F. ARTILLERY.	H. M.'s 9TH A. S. 1015.	1ST EUROPEAN L. INFANTRY A. S. 779.	2D EUROPEAN REGIMENT. A. S. 782.								
MONTH.	Admitted.	Discharged.	Died.	Admitted.	Discharged.	Died.	Admitted.	Discharged.	Died.	Troops	Admitted.	Discharged.	Died.
May, ...	0	0	0	0	0	0	0	0	0	H. M.'s 50th and H. Arty.	122	55	66
June, ...	0	0	0	0	0	1	19	5	10	H. M.'s 62d H. & F. Arty.	105	90	33
July, ...	14	2	12	2	2	0	7	4	7	H. M.'s 9th Foot, ...	134	95	38
August, ...	87	20	46	120	59	34	108	49	38	H. C.'s 1st Eur. Lt. Infy.	130	88	42
September,...	21	33	8	12	34	4	21	38	3	H. C.'s 2d Eur. Regiment	26	9	17
October, ...							0	1	0				
Total, ...	122	55	66	134	95	38	180	88	26	9	517	337	196
										Grand Total, ...			

REMARKS.

In looking at Table No. I. of the return of admissions, cures and deaths from the Blue Epidemic Cholera of 1815, as it occurred among the European Troops at Umballa during the months of May, June, July, August, September and October, we find that out of a Total of 2267 no fewer than 392 admissions took place or 12.78 per cent. The number cured was 180 or 45.68 per cent, less than half the admissions.

If we examine the separate detachments, the admissions in the H. A. are 8.98 per cent, the cures 1.15 per cent and the deaths 6.71 per cent on the strength, while on the admissions, the cures were 24.13 per cent, or less than a fourth and the deaths 79.30 or more than three fourths. In the Foot Arty. the admissions on the strength were 13.74 per cent, the cures 5.91 per cent, and the deaths 13.89 per cent. On the admissions the cures were 42.85 less than half and the deaths 57 or more than half.

In H. M.'s 3d Light Dragoons the admissions on the strength were 16.39 per cent, the cures 8.68 per cent, and the deaths 7.31 per cent. On the admission the cures were 53, or more than a half, and the deaths 44, or less than a half.

The admissions on the strength in H. M.'s 31st Foot are 20.83 per cent, the cures 9.66 per cent, and the deaths 9.11. On the admissions in this Regiment the cures were 45.80, less than half and the deaths 52.76, more than half.

The average of the whole cures on the admissions at Umballah is 41.89 and of the deaths 58.26. In H. M.'s 3d Light Dragoons alone, did the cures exceed the deaths and among the whole more than half died.

I do not make these calculations with any view of contrasting the different degrees of success among the Medical Officers at Umballa, on the contrary, I am convinced, that almost all the cases wherever they occurred, where the permanent symptoms of Blue Cholera were established, terminated fatally, and the degree of success which attended one mode of practice as compared with another arose entirely from the disease being arrested before it had reached the stage of collapse; that cures occurred in the latter I do not deny, but so far as my own experience goes I am free to confess, that only a very few, I might say scarcely any, recovered when the pulse had ceased, the skin was completely blue and no secretions existed evincing the total loss of vitality in the blood.

Let us now turn to the result at the out stations of Loodianah, Ferozepore, Kussowlee and Subathoo as well as Sukkur, as exhibited in Table No. 2, and we find in H. M.'s 50th Foot or Queen's Own that the admissions on the strength were 13.32 per cent, the cures 6 per cent and the deaths 7.21 per cent. On the admissions the cures were 45 per cent or nearly a half and the deaths 54 or rather more than half. At Ferozepore in H. M.'s 62d Regiment the admissions on the strength were not ascertained as the return contained the cases in the Horse and Foot Artillery, but the total admissions to the strength of the European Force there may be taken at 9 per cent, the cures at 8 per cent and the deaths at 3 per cent, on the admissions the cures were 85 per cent and the deaths 31 per cent.

At Kussowlee the admissions to the strength were 13 per cent, the cures 9.3 per cent, and the deaths 3.74 per cent. On the admissions the cures were 70 per cent and deaths 28 per cent.

At Subatho, the admissions were to the strength 16.68 per cent, the cures 11 per cent and the deaths 5 per cent. On the admissions the cures were 67.69 per cent and the deaths 32.3 per cent.

At Sukkur the admissions in the 2d European Regiment to the strength were 3.31 per cent, the cures 11.5 per cent and the deaths 21.7. On the admissions the cures were 34.6 per cent and the deaths 65.38 per cent.

From the above it will appear that the largest proportion of admissions occurred in the 1st European Light Infantry at Subathoo, and the largest number of cures in H. M.'s 9th Regiment at Kussowlee.

I am not able to give the details of the treatment pursued by the different Medical Officers on the frontier, but I believe at Kussowlee, where the deaths are fewer in proportion than at any other place, the free use of brandy was adopted, with regard to this and other stimulants, it is easy to see that where absorption can place, the loss of vitality in the blood when not entirely gone may be restored by pouring spirit into the stomach as well as other stimulants, such as Ay. Ammoniac, Ether, eau de luce, ol, Cajeputi and the various stimulants which have been had recourse to in this intractable disease. But all practitioners who have witnessed Cholera in its Epidemic form must have observed, that after a time, no stimulant given internally or applied externally appears to be of any use in causing reaction, the blood has lost its vitality and unless the portion of blood containing it in the brain can be diffused throughout the system, the case is hopeless. In the early stage of the disease, there is no doubt that external friction, and heat with stimulants internally may be of use in arresting the still further loss of vitality, but when the body is *blue*, an index of the complete loss of vitality, I fear we must confess our inability of being of much use.

The employment of oil of Peppermint* has sometimes appeared to be of use both as a preventive and also when the disease has set in, at least during the present Epidemic the administration of it by my worthy friend Father Vincent appeared to be followed by success, but like every thing else, it may be and was abused, for I found many children and even grown up people complaining of excessive irritation in the stomach and bowels, and on making minute enquiry was told that there being a little nausea or looseness, the peppermint oil had been given and in such doses as evidently produced excessive irritation if not subacute inflammation of the mucous membranes of the *primæ viæ*. In the absence of Medical advice, nothing is more natural than for a person who feels out of sorts during the prevalence of Cholera to take a cordial of some kind, but when Blue Epidemic Cholera prevails, no time is to be lost in applying for aid in order that the disease may be arrested at once, in no disease is delay so dangerous as in this, and from being one of the most easily arrested if met within the stage of invasion, it becomes the most deadly, if allowed to proceed to that of Collapse.

Though I have endeavoured to illustrate the importance of the early use of the lancet in the Stage of invasion as inculcated by Sir. James Annesley, I am well aware of the difficulty that exists in adopting it. For it is no easy matter to convince even a Medical man that a remedy which could effectually arrest a disease at one period ceases to be of use, nay, may be actually worse than useless in a few minutes! But so it is with the lancet in Blue Epidemic Cholera, it cures in the Stage of invasion, but fails, nay accelerates the disease in the Stage of Collapse.

* Recommended by Mr. Corbyn see his work.

TABLE 3.

Showing the number of admissions, cures, and deaths from the fever which succeeded Blue Epidemic Cholera at Subathoo during the months of September and October 1845.

<i>Disease,</i>	<i>Admitted.</i>	<i>Cured.</i>	<i>Died.</i>	<i>Remarks.</i>
Fever, ...	92	90	2	The discharges took place during Sept. Oct. and Nov.
Total.	92	90	2	

It was my intention to have detailed some of these cases, but the same symptoms marked them all, viz. A strong, hard full pulse, dry skin, violent headach, heat of scalp, urgent thirst and irregular secretions. The Lancet was the sheet anchor in the case, with shaving and leeching of the head, blisters to the back of the head, and cold lotion to the bare scalp, free purging with the croton oil combined with henbane or opium, Diaphoretics and diluents. In Apyrexia, the free use of quinine. In many, pain was complained of in the Abdomen, and in such cases leeches were repeatedly applied and also Blisters. When heat of scalp remained after the free use of the Lancet, leeches were had recourse to with the most marked effect.

I shall here introduce an outline of some cases of Goitre or Bronchocoele which appeared during the prevalence of the Blue Epidemic Cholera as the occurrence of them at this period was a curious one and the efficacy of quinine in removing the complaint when Iodine had failed is worthy of remark.

Case I.—Edward Murphy, private No. 3, Company 1st European Light Infantry. Oct 26, admitted 2nd September 1845.

Thyroid Gland enlarged; has been treated for Cholera from which he recovered. This man took the Hydriodate of Potass internally daily to the extent of 15 grains, and after the removal of the cuticle the Iodine ointment was rubbed over the swelling morning and evening until the 27th, but without any visible effect. After this the Iodine was omitted and he took 10 grains of quinine daily only for 4 days, when the tumour was removed and the case discharged on the 1st October.

Case II.—William Clarke, private No. 2 Company 1st European Light Infantry. Oct 22, admitted 2nd September 1845.

Symptoms similar to those of Case I. The Iodine produced no visible effect in reducing the size of the swelling and quinine in 10 grain doses was substituted and in a few days the Goitre disappeared.

Case III.—David Walker, private No. 2 Company 1st European Light Infantry. Oct 24, admitted 2nd September 1845.

Symptoms and treatment the same as in cases I and II with Iodine, but

equally ineffectual, until the Quinine was given, which in a few days removed the complaint.

Case IV.—Thomas Murray, private No. 2 Company 1st European Light Infantry. Oct 22, admitted 2nd September 1845.

After a full trial of Iodine without effect, he took the Quinine and the result in a few days was the disappearance of the Goitre.

Case V. Edward Purcell, private No. 2 Company 1st European Light Infantry. Oct 22, admitted 2nd September 1845.

This like the others yielded to Quinine after the Iodine had been tried in vain.

Case VI.—William Stewart, private No. 6 Company 1st European Light Infantry. Oct 22, admitted 17th September 1845.

This man took the Hydrisdate of postass and rubbed in the Iodine ointment over a blistered surface until the 27th, when both were abandoned and the Quinine substituted with the same beneficial results as in the other cases.

Case VII.—Thomas Hyten, private No. 4 Company 1st European Light Infantry. Oct 24, admitted 17th September 1845.

This case was treated at first with Iodine, but as no effect was produced in the size of the swelling, the cure was accomplished by the Quinine.

What is somewhat remarkable with regard to these cases of Goitre is the circumstance of 4 out of the 7 occurring in the same company, namely, No. 2. Only one of the men had been afflicted with Cholera. These 4 cases of Goitre had been in the barrack for some days, and the swellings gradually increasing. The men took no notice of them, until their size was such as to prevent their tying on their stock. They were thus brought to the notice of the Captain Commanding the Company, who sent them to Hospital. It is worthy of notice, likewise, as regards the 4 cases from No. 2 Company, that the men of this Company were exempt from the Epidemic until the Regiment moved out of Barracks into camp.

It is curious thus to witness Goitre and Cholera occurring at one and the same time, and preserving their distinct characters, while all other affections merged into the prevailing Epidemic. This circumstance would probably suggest some connexion between the remote exciting cause, though I am not aware that the occurrence of Goitre has previously been observed during Epidemic Cholera; and its appearance at Subathoo must have been connected with the usual remote exciting cause of Goitre peculiar to the hills. Though the two diseases may, thus, arise from two distinct sets of exciting causes, it is remarkable that the Cholera which usurped the place of every other ailment, in fact, the latter appeared, as a predisposing cause, should not have appeared in this Barrack until the men had returned from camp.

I alluded to the circumstance of the Blue Epidemic Cholera not being likely to appear for two successive years in the North Western Frontier, but that Scinde and the country to the North West might be visited by this scourge. The length of time which this treatise has taken in passing through the press (occasioned solely by my inability to correct the proof sheets while on active service in the field) has enabled me to add a few remarks on the important subject of what I assigned as the great remote exciting cause of Blue Epidemic Cholera. It will have been seen, that this cause advanced

during 1845 from the confines of Persia, traversing Afghanistan, crossing the Indus and invading the Punjab, and in all these countries committing fearful ravages. It then appeared at Ferozepore as early as June, and successively visited Umballah, Subathoo, Kussowlee, crossed the Jumnah and ravaged the Doab, appearing at Seharunpore, Meerut, &c. The Epidemic thus preserved a Northern latitude and did not extend to Scinde, which, during the year 1845, was comparatively healthy, particularly Kurrahee. To the Blue Epidemic Cholera succeeded a violent fever, which prevailed on the frontier during October and November. From the beginning of December until the month of May or June, the Epidemic Cholera appeared to have subsided. But in those months it again appeared in Meywar and Malwah, as well as Scinde and at Kurrahee, a place remarkable in former years for its salubrity, the Cholera was fearfully destructive, as we learn from the public papers, in which it is stated that upwards of 200 of H. M's 86th Regiment had fallen victims to it, and so numerous and sudden were the deaths, that separate graves could not be prepared for the dead and they were buried in pits. Not only has the Epidemic visited Scinde, Malwa, Meywar, but all accounts describe it as travelling through Arabia along the Red Sea, and it was prevalent and fatal at Aden. In June it raged in Rajpootanah, and the Cantonment of Nusseerabad suffered severely. The probability is, that the Epidemic will visit the shores of the Caspian and perhaps reach Russia and other countries of Europe. This great and deadly disease is thus seen wending its mysterious progress over the globe and no local cause will account for it. No measures of prevention can arrest its progress. There seems no agent with which we are acquainted capable of becoming the great remote cause of such a fearful disease which traverses continents, crosses rivers and seas with the speed of lightning, destroying its victims in a few hours in spite of all human aid unless the one we have suggested, namely, a column or stratum of air in a negatively electrified state which thus acting on the earth's inhabitants exhausts their nervous energy and destroys the vitality of the blood. When treating of this cause, I stated that if Cholera visited the same tracts for two successive years, our theory might be incorrect, but, on further considering this point, two circumstances must be taken into consideration.

First. Is this column or stratum of negatively electrified air a constantly moving one, visiting in succession various countries and tracts of the globe, or

Secondly. Does the stratum of air in the vicinity of places where the Epidemic is raging become thus negatively electrified, and when restored to its equilibrium, the disease ceases to exist.

If we consider the first point as settled, then it follows, that the great remote exciting cause of Epidemic Cholera is always present in some portion of the globe and visits countries in succession. This is in accordance with fact but in doing so there are several of these moving strata of air, and if this be not allowed, the one in operation must be of vast extent, for, we find in India, that while the Epidemic is raging on the North West Frontier, it prevails in Bengal and other distant portions of country. This circumstance might seem to prove, that it was the stratum of air immediately over the locality affected that had thus become negatively electrified, and for a time continued to produce Blue Epidemic Cholera until its equilibrium was restored by the occurrence of a thunderstorm or heavy rain. If we allow the first view of the case to be the correct one, and suppose that a negatively electrified stratum of air traverses countries as the great remote exciting cause of Cholera, then we can hardly account for its cessation, unless when its equilibrium is restored. On the whole, the idea of this stratum of air traversing countries abstracting the electrical fluid from the human species, thereby exhausting the nervous energy and destroying the vitality of the blood appears the most rational. It may be said, if this were so, how does this stratum of air leave one place until it has destroyed the whole population? We answer, that it would not, were every living being predisposed to the disease, but such not being the

case, it destroys all those who are so and then proceeds in search of more victims, if we may be allowed the expression! People in health as regards their digestion, nervous system, in short, their vital actions escape the Epidemic, they may probably suffer from loss of energy, but still, the latter is not sufficient to destroy the vitality of the blood and they escape the disease.

The subject of the great remote exciting cause of Epidemic Cholera is an intricate one, and although I have attempted to unravel it, I am perfectly free to confess, that there are circumstances connected with its progress which I do not pretend to explain, though the cause assigned as the great remote exciting one appears to me the only one, at all capable of inducing the essential cause, namely, the loss of vitality in the blood, whereby the disease becomes so deadly a one. There is no other Agent with which we are acquainted that produces such an effect, the greatest increase of temperature in hot and tropical climates may produce violent and deadly fevers, such as occur in Africa and the West Indies, and yet there Epidemic Cholera is not witnessed. That heat or caloric has nothing to do in the *essential essence* of the cause of Cholera is proved by the circumstance of the Epidemic being as virulent in the cold, as in the hot season, and occurring with equal virulence at the altitude of 6000 feet as in the plains of India. That there is some unknown connection between the electricity and caloric, no one is disposed to doubt, for, the evolution of the former is always followed by the production of the latter, as witnessed in cases where the Electric fluid sets fire to buildings, and also where the trees of the forest are charred, as if they had been exposed to a burning fire.

Another agent essentially concerned in the vital function of respiration is Oxygen. It is an ingredient of the air we breathe and appears the Agent which restores the diminished vitality of the blood after it has produced the various secretions and supported the structures of the body.

Some might be inclined to view the absence of Oxygen from the atmosphere as sufficient to account for the loss of vitality in the blood, and thus become the remote exciting cause of Cholera Asphyxia. But were this the cause, all the individuals exposed to its action must suffer; the air we breathe acts immediately on the lungs without the intervention of the nervous system, and the state of the latter would exert no influence on the disease which would attack every one indiscriminately who chanced to come within the range of its action. Neither Caloric nor Oxygen will account for Cholera, nor the facts connected with its progress which latter proves, that the remote exciting cause must act through the nervous system, and on the state of the latter depends the predisposition to or immunity from the action of the remote exciting cause. Some attribute disordered digestion as likely to cause Cholera, but it is difficult to conceive any action arising from a certain state of the atmosphere which could act on the digestion in such a way as to set up Blue Epidemic Cholera. The true remote exciting cause is one which acts speedily on the nervous system, destroys its energy, by which congestion and loss of vitality in the blood is produced, the former being the essential cause of *Sporadic Cholera*, as well as congestive fevers, the latter, the great and unique essential cause of one disease alone, namely, *Blue Epidemic Cholera*. In order to render my views regarding the remote exciting cause of Blue Epidemic Cholera as intelligible as possible, I shall, at the risk of being considered prolix, enter a little further into the subject.

The stratum of negatively electrified air, which acts in abstracting the electric fluid from the human body, and thereby depressing the nervous system to an extent incompatible with the vitality of the blood, must occur, when both the atmosphere and the earth we inhabit are in a similar state, for, were they in opposite states, that is, the one positively, and the other negatively electrified, or, *plus* and *minus* as it is called, the equilibrium would be speedily restored, since this is the nature of the electric fluid, and bodies in the same state of electricity mutually repel each other, while those in opposite state

attract each other. If then a certain portion of the atmosphere be negatively electrified, and the earth in a similar condition, the equilibrium cannot be restored, until either the one or other becomes positively electrified. Before this can take place, any body possessing electricity will become exhausted to supply the deficiency of the atmosphere. The vital actions of the human body indicate a positive state of electricity. The Electric fluid, which exists in our bodies is received, or given out through the medium of the nerves; we do not mean by this, that the nerves are conductors of Electricity, they may be the reverse, as experiments instituted by Doctor Stark and others would appear to prove. But the action of electricity on an exposed nerve is well known, and in the dead subject, this action causes muscular contraction through the medium of the nerve exposed to the electric fluid. Not only are the muscles made to contract in the dead body by the power of electricity, but even the vital process of digestion is restored by forming a galvanic circle between the cut extremities of the 8th pair of nerves. This, however, occurs in the living body where there is vital blood, and it would be in vain to attempt the same experiment with any chance of success in a case of Blue Epidemic Cholera, where the blood had lost its vitality. In short, the arterial living blood is capable of producing secretion under the influence of the nerves, but if the blood has lost its vitality, as in the dead subject, or in Collapse from Blue Cholera, no secretion can take place, whatever the influence of the nerves may be, or however much this may be increased, unless by the action of some cause which can be made so to act on the whole body as to restore the tone of the nervous system and of the sanguiferous which appears to depend upon it for its vitality.

When the earth is negatively electrified, and the clouds indicate a positive state, the vital actions are languid and all animated creation is sensible of this depressed condition, and long for a thunder storm by which the equilibrium may be restored. Under these circumstances, if instead of electricity being imparted to the earth and its inhabitants, a stratum of air near the earth's surface becomes negatively electrified, it will abstract the electric fluid from the living bodies possessing a positive degree of electricity. It is remarkable that while the human species thus suffer, the lower animals do not, and the conclusion therefore is that from the greater perfection of the nervous system in man, he is never in a negatively electrified state, until by the action of the remote exciting cause of Epidemic Cholera, he becomes so, and the condition thus induced being incompatible with the life of the blood, and vital actions, animal and organic life speedily cease to exist.

This then appears to be the mode by which the remote exciting cause of Epidemic Cholera acts, but how this cause is generated and spreads from one part of country to another is not so easily accounted for.

It may be a question, whether, when Epidemic Cholera appears in cold and temperate climates where it seldom exists, the stratum of air acting as its remote cause is generated there, or carried through the atmosphere from continent to continent and across seas from one quarter of the globe to another. The Epidemic Cholera is emphatically said to *travel*, indicating that the negatively electrified stratum of air does traverse the atmosphere. The objection to this view is, that when Epidemic Cholera visits the East, it should not in every instance find its way across the ocean or along the countries of Afghanistan, Bokhara and Persia to the Caspian, and hence to Europe. That the stratum did traverse this route in 1831 seems established from the appearance of the disease in Russia, the first place in Europe, and from thence spread to the continent of Europe, visiting the Islands of Great Britain and Ireland and afterwards the great continent of America. We are almost compelled to view this remote cause of Epidemic Cholera as travelling from country to country, and traversing, in succession, one quarter of the globe to another. If this view be the correct one, and the history of Cholera

both in 1845 and the present year would seem to support it, the N. W. Frontier of India has little need to dread the visitation during this year, since the same cause which acted in producing the disease in 1845 is now wending its way in Scinde, Rajpootanah, Meywar, Malwa and along the coast of the Red Sea. The disease is called the *Oriental Cholera* and with great propriety, for, it has never been observed to come from Europe to Asia, but always proceeds from the latter to the former. The disease is usually observed when after a heavy fall of rain, a long continued drought occurs, and though the electric fluid be darted on the tops of the mountains, yet the equilibrium between the earth and atmosphere is not restored. Another difficulty however attending this view of the case is the circumstance, that during the prevalence of Epidemic Cholera a thunderstorm occurs with a heavy fall of rain, thereby appearing to remove the exciting cause by restoring the equilibrium between the earth and the atmosphere, and yet soon after the Epidemic breaks out in a neighbouring tract of country. Thus, in September 1845, the occurrence of rain with thunder and lightning appeared to remove the exciting cause in the Hills, and in fact produced an opposite state of the electricity on the earth, and yet soon after the Epidemic Cholera appeared in the country beyond the Jumnah, spreading its ravages throughout the Doab. How could this have happened, if by the occurrence of rain, thunder and lightning, the exciting cause had been destroyed? Either we must suppose that the negatively electrified stratum of air had passed over the place previous to the change in the weather, or that a similar stratum was formed at the successive places where the Epidemic appeared. There is no reason to suppose, that the same stratum of air traverses India invariably, nay, it is certain that more than one exists at one and the same time, and in some parts of the country is seldom absent, as in Bengal. The fair conclusion appears to be, that this negatively electrified stratum of air sometimes travels in succession different tracts of country as in 1845, and also appears as a local cause, as in the lower provinces giving rise to the disease, where it is present and seldom extending its cause to any great distance.

Did the Epidemic Cholera which appeared at Sunderland in 1831 owe its origin to a local cause as the remote exciting one, or was it the same cause that had traversed the East, Russia, France and other continental countries previously; and the same which, afterwards, crossed the Atlantic to America. Much might be said on both sides. If it was the former, the same causes must have been in operation at Sunderland as in the East. If the latter, there is no wonder that the Epidemic appeared first at that place, though it might equally have done so in the midst of London. Its occurrence at a sea-port town in England and afterwards spreading over the Island would indicate that the remote cause had reached Sunderland first, and then continued its course over England, Scotland and Ireland. That it afterwards crossed the Atlantic and eventually died away.

We are on the whole inclined to think, that the great source of Blue Epidemic Cholera is in the atmosphere of the East, that it is common in most parts, and generally present, while in others, it appears after intervals of years, and in doing so traverses several countries in succession. Reasoning thus, I believe the Epidemic which has ravaged Meywar, Malwa, Rajpootanah and Scinde is a fresh Epidemic, as it is not likely that the progress of that of 1845 should have been arrested for so many months and again broken out.

I have by no means exhausted the subject, and have no wish to make my readers believe, that all my views are correct regarding the origin and progress of the great remote exciting cause of Cholera. The electrical state of the atmosphere, as connected with Cholera, has not originated with me, but occupied the attention of the first phisiologists of Europe; nevertheless, I have endeavoured to explain my views on the subject, and I trust others will prosecute the enquiry; for it will be seen from the imperfect remarks in this short treatise, that much yet remains to be known regarding this mys-

terious disease, and though I have bestowed some labour and pains in elucidating my views, I am fully aware how inadequately I have performed the task. But if this humble attempt should be the means of stimulating my Medical brethren in the East to give the world their observations on Blue Epidemic Cholera when it comes under their notice, I shall consider my labours well bestowed, and if the measures I have endeavoured to inculcate in the stage of invasion shall be the means of saving the life of a fellow creature, I shall be amply recompensed.

FINIS.

